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No. 517

JANUARY, 1906

Vol. XLIV

THE
JOURNAL OF BOTANY
BRITISH AND FOREIGN

EDITED BY

JAMES BRITTEN, K.S.G., F.L.S.

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THE JOURNAL OF BOTANY was established in 1863 by Dr. Seemann. In 1872 the editorship was assumed by Dr. Henry Trimen, who, assisted during part of the time by Mr. J. G. Baker and Mr. Spencer Moore, carried it on until the end of 1879, when he left England for Ceylon. Since then it has been in the hands of the present Editor.

Without professing to occupy the vast field of general Botany, the Journal has from its inception filled a position which, even now, is covered by no other periodical. It affords a ready and prompt medium for the publication of new discoveries, and appears regularly and punctually on the 1st of each month. While more especially concerned with systematic botany, observations of every kind are welcomed. Especial prominence has from the first been given to British botany, and it may safely be said that nothing of primary importance bearing upon this subject has remained unnoticed.

Bibliographical matters have also received and continue to receive considerable attention, and the history of many obscure publications has been elucidated. Every number contains reviews of new and important books written by competent critics: in this as in every other respect a strictly independent attitude has been maintained. While in no way officially connected with the Department of Botany of the British Museum, the Journal has from the first been controlled by those whose acquaintance with the National Herbarium has enabled them to utilize its pages for recording facts of interest and importance regarding the priceless botanical collections which the Museum contains. In 1896 it became necessary to increase the size of the Journal, owing to the number of papers sent for publication: the number of plates was at the same time augmented.

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VOL. XLIV.

ILLUSTRATED WITH PLATES AND CUTS

LONDON:
WEST, NEWMAN & CO., 54, HATTON GARDEN.
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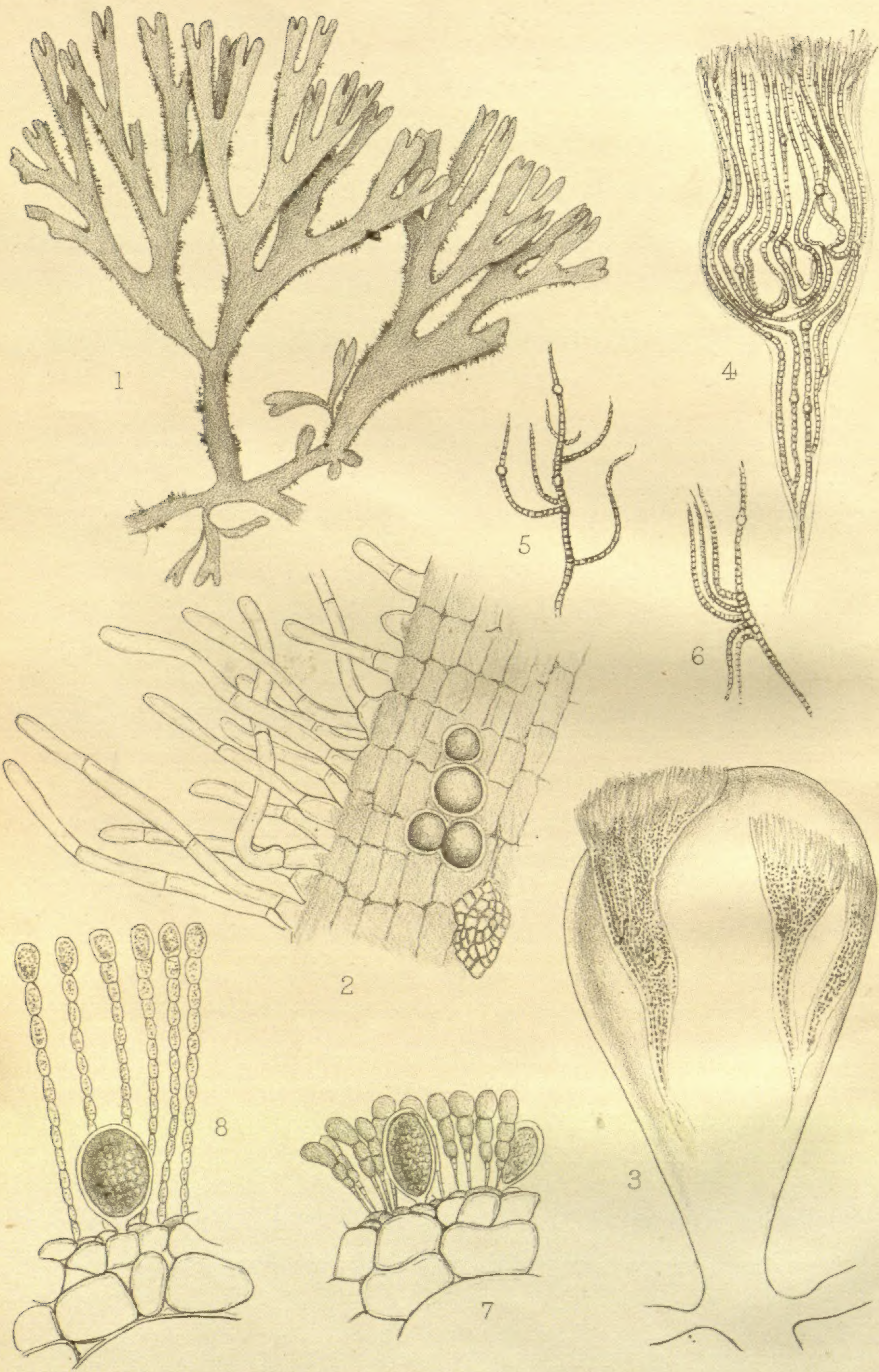
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THE
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BRITISH AND FOREIGN.

NEW OR CRITICAL BRITISH MARINE ALGÆ.

By E. A. L. BATTERS, B.A., LL.B., F.L.S.

(PLATE 475.)

DURING the past year several new or critical species have been added to the list of British marine algæ, and although most of them are small and inconspicuous plants, I venture to think that they are not without interest to algologists. The following list does not profess to be complete, but it contains the names of those species that have passed through my hands during the twelve months that have just expired. Two of the plants named are new to science, and at least three of them are representatives of genera that have never before been found in Britain.

1. *CHLOROGLÆA TUBERCULOSA* (Hansg.) Wille, *Algologische Notizen*, i.-vi. in *Nyt Magazin for Naturvidenskab*, xxxviii. (Kristiana, 1900). Amongst the algæ which I obtained from the executor of the late Mr. Buffham were two specimens of the above plant. Both were epiphytic on a species of *Cladophora* (probably *C. utriculosa* Kütz.), on the branches of which they formed minute dingy green warts. The microscopic characters and measurements agree well with Wille's figure and description. Mr. Buffham's specimens were obtained at Deal, but I have since found the plant in more or less abundance epiphytic on *Rhodochorton Rothii*, &c., in caves at Berwick-on-Tweed, and at Lulworth Cove. No doubt the plant is common enough, but it needs looking for.

2. *Diplocolon Codii*, sp. nov. Plate 475, figs. 3-6. Fronds minute, creeping between the cortical cells of *Codium tomentosum*, broadly claviform, 250-500 μ long, 100-150 μ broad above, tapering downwards to a width of scarcely 20 μ , gelatinous, irregularly dilated, yellowish-brown above, more or less grumous. Filaments 8-9 μ thick, repeatedly pseudo-branched, flexuous, curled and twisted within the sheath like those of a nostoc. Trichomata 6-8 μ wide, dirty green. Heterocysts subglobose, considerably wider than the trichomata.

Hab. Epiphytic between the cortical cells of *Codium tomentosum* Stackh. Sidmouth, August, 1901, E. A. B.

In the autumn of 1901, I found in a rock-pool near the Picket

Rock, Sidmouth, two specimens of *Codium tomentosum* which had a very peculiar appearance; on examining them with the microscope I found that they had been attacked by this curious little epiphyte. In general appearance the plant might pass for *Microcoleus chthonoplastes*, from which it can instantly be distinguished by the numerous heterocysts, the pseudo-branching of the trichomes, and the curious manner in which they are coiled and twisted within the sheath.

3. *CHÆTOBOLUS GIBBUS* Rosenv, Grönlands Havalger, p. 928, fig. 41. Shortly before his death the late Mr. Edward George sent me some specimens of *Chætomorpha melagonium* which he had gathered in September, 1897, at Kilkee. I noticed that these specimens were covered with small dark green swellings, but I did not examine them at the time. Subsequently I found at Sidmouth similar specimens, which, upon examination, proved to be the above-named species mixed with a brown crustaceous alga, which may turn out to be *Lithoderma Kjellmani*, but in the absence of spores I cannot identify the plant with certainty.

4. *ULOTHRIX CONSOCIATA* Wille, Studien über Chlorophyceen, p. 25. Amongst the slides of marine algæ mounted by the late Mr. Buffham, which I obtained on his death, is a specimen of a *Ulothrix*, which must certainly be referred to this species. In every way it corresponds with the figures and description given by Wille, *l. c.* It was obtained at Dover, but no date is given.

5. *LEPTONEMA LUCIFUGUM* Kuck, Ueber zwei höhlenbewohnende Phæosporeen (Beiträge zur Kenntniss der Meeresalgen, iv. 1897). I found this species (bearing sporangia, though sparingly) in the caves near the Picket Rock, Sidmouth, in the autumn of 1901, and again in the caves at Livermead, near Torquay, August, 1902, and in the caves at Dodd's Well, Berwick-on-Tweed, 1904.

It forms a thin widely-expanded yellowish-brown crust on the sides of the caves, from which it can be cut with a knife in patches of considerable size. I had hoped to find *Ectocarpus lucifugus* Kuck mixed with it, but in this hope I was disappointed.

6. *LEATHESIA CRISPA* Harv. I received some beautiful specimens of this rare and little-known species in June, 1904, from my sister, Mrs. Hamber. She found it in considerable abundance at Grey-stones, County Wicklow. This is the first recorded station for the species in Ireland.

7. *Mesogloia neglecta*, sp. nov. Plate 475, fig. 7. Fronds, and branching like those of *Chordaria flagelliformis* or *Mesogloia Griffithsiana*. Peripheral filaments 50–60 μ long, claviform, torulose, the three or four upper cells large and coloured, those at the base very slender and colourless. Spores large, oval, 40–50 μ long, nearly as long as the peripheral filaments.

Weymouth, August, 1900, E. A. B.

In general appearance and structure this species greatly resembles *Mesogloia Griffithsiana*, from which it can easily be distinguished by the very much shorter cortical filaments, and the proportionally large spores. While in *M. Griffithsiana* the cortical filaments gradually taper from the apex downwards, and all the cells are coloured, in *M. neglecta* the three or four upper cells are large,

swollen, and deeply coloured, whilst the basal cells are very slender and colourless. Again, in *M. Griffithsiana* the spores are only about one-third the height of the cortical filaments, in *M. neglecta* they are very nearly as high as the surrounding filaments. A good idea of the differences between the two species can be got by an examination of figures 7 and 8 of the plate.

8. *Dictyota spiralis* Mont. Alger, p. 29. Plate 475, figs. 1 and 2. In August, 1901, at Sidmouth, and again at Torquay in August, 1902, I found a *Dictyota* which in most respects resembled *D. dichotoma*, but differed from it in having all the edges of the fronds thickly covered with a dense coating of hairs. My specimens agree so well with the description of *D. spiralis* that I have no hesitation in referring them to that species or variety.

9. *Acrochætiûm Alariæ* (= *Chantransia Alariæ* Jöns. Marine Algæ of Iceland (Botanisk Tidsskrift, xxiv. 132)). This species has been recorded from Ireland in a recent number of this Journal (J. Adams, Journ. Bot. 1904, 351). But it has not, I think, been noticed that Harvey found at Miltown Malbay, some time before 1833, what he calls (Hooker, Crypt. Fl. p. 349) *Callithamnion secundatum* on *Alaria esculenta*. I have no doubt that the plant referred to by Harvey was really *A. Alariæ*, although no proof of the fact can now be obtained. I found the plant covering large surfaces of the fronds of *Alia* at Berwick-on-Tweed in August, 1904. My specimens grew in company with *Ectocarpus confervoides* Le Jol. var. *pygmæa* Kjellm., and an equally stunted form of *Ectocarpus Hincksia*.

10. *Rhodochorton penicilliforme* (Kjellm.) Rosenv, Algues Mar. du Grœnl. p. 66 (Ann. Sci. Nat. vi. 8, t. 19). Amongst some specimens of marine algæ sent to me from St. Mary's, Scilly, in September, 1899, by the late Mr. E. George, are some beautiful specimens of the above species growing on a *Sertularia*. I have also gathered the plant at Berwick-on-Tweed in March, 1889, but at the time I mistook it for *R. membranaceum*, a species from which it can easily be distinguished by its very beautiful basal disc, and also by the fact that it is an epiphyte, and always grows on the outside of the branches of the *Sertularia*, never within them.

11. *Rhododermis elegans* Crouan var. *Zostericola* Batt. in herb. At Weymouth in August, 1900, and again at Torquay in 1904, I found on the fronds of *Zostera marina*, a variety of *R. elegans*, which differs from typical specimens in forming only a very narrow border along the edges of the fronds of the host-plant, never spreading out into wide expansions.

EXPLANATION OF PLATE 475.

- FIG. 1. *Dictyota spiralis* Mont., natural size.
 „ 2. A portion of the edge of a frond of above, $\times 100$.
 „ 3. A cortical cell of *Codium tomentosum* with *Diplocolon Codii*, $\times 150$.
 FIGS. 4, 5. Portions of a frond of *Diplocolon Codii* more highly magnified.
 FIG. 6. Portion of the same showing the pseudo-branching.
 „ 7. A small portion of a transverse section through the frond of *Mesogloia neglecta*, showing cortical filaments and spores, $\times 250$.
 8. A portion of a similar section through the frond of *Mesogloia Griffithsiana*, $\times 250$, for comparison with fig. 7.

THE GENUS CERATOSTIGMA.

BY LIEUT.-COLONEL D. PRAIN, F.R.S.

THE Plumbaginaceous genus *Ceratostigma* was founded by Bunge in 1834 on a plant collected by himself a few years before in the neighbourhood of Pekin.* The original species (*C. plumbaginoides* Bunge) was subsequently found to occur in and about Shanghai and other Eastern Chinese cities; it attracted sufficient notice to ensure its transmission to Europe, and its establishment in western horticulture. Lindley, shortly after its introduction to England, described and figured it under the name *Plumbago Larpentæ*;† this name is still occasionally associated with it in European gardens.

At least a quarter of a century before Bunge discovered *Ceratostigma plumbaginoides* in North-east China, Salt had found in the Abyssinian highlands another Plumbaginaceous plant, which R. Brown considered to be new, and, without describing it, named *Plumbago eglandulosa*.‡ This plant was again collected by Schimper, in whose collections it and another closely allied form were treated by Hochstetter as the basis of a distinct genus *Valoradia*, first defined in 1842.§

A few years later Boissier, when monographing the *Plumbaginaceæ*,|| showed that, in spite of their remote geographical areas, Bunge's *Ceratostigma* and Hochstetter's *Valoradia* are congeneric. For reasons not now thought adequate, Boissier used Hochstetter's name in preference to that of Bunge; most subsequent writers, however, have adopted the name given by Bunge.

Since Boissier wrote, no Abyssinian material has been received by which we can decide whether Schimper's two *Valoradias* be, as Hochstetter considered, different plants, or, as Oliver has suggested, merely conditions of one species.¶ We do, however, now know that a species nearly allied to Salt's Abyssinian one, but with a different habit of growth, occurs in Somaliland.

The record, since Boissier wrote, of several additional Asiatic species of *Ceratostigma* has lessened the singularity of distribution commented on by him and other authors. Besides the herbaceous Chinese species known to him, another herbaceous species occurs in Indo-China. A very different shrubby species extends from Western China into Eastern Tibet, while another nearly allied shrubby species occurs in the Eastern Himalaya. A fifth Asiatic species, also a shrub, is endemic in Tibet.

The break in the area occupied by *Ceratostigma* is thus less extensive than was believed to be the case, and although the western

* Bunge, Enum. Pl. Chin. p. 55 (1834).

† Lindley, Gard. Chron. vii. p. 732, with fig. (1847).

‡ Brown in Salt Voy., App. iv. p. lxiv. (1814).

§ Hochstetter in Flora, xxv. 239 (1842).

|| Boissier in DC. Prod. xii. 694 (1848).

¶ Oliver in Flor. Trop. Afr. iii. 487 (1877).

edge of the tract occupied by the Asiatic species of the genus is still remote from its African territory, it is not far distant from the eastern limit of the allied genus *Vogelia* Lamk., which extends from India to Arabia and Socotra, and occurs again in South Africa, always in countries that are warmer than those affected by the species of *Ceratostigma*.

The generic description of *Ceratostigma* given in this paper is based on an examination of the material in the Herbaria of Kew and Calcutta. It is not, as regards the account of the calyx, in accord with the statements of previous writers. Boissier speaks of a pair of marginal nerves in each calyx-segment, and the authors of the *Genera Plantarum* say that each lobe of the calyx is 3-nerved. There is, however, in *Ceratostigma*, as in *Vogelia*, only one nerve in each of the five glumaceous, linear-lanceolate sepals proper. The hyaline membranous web which stretches between and unites the contiguous margins of the individual sepals is, owing to the connivent position which these rigid green parts of the calyx assume, thrown into two distinct longitudinal folds that when first examined look quite like marginal nerves. At the base of the calyx these five green segments are united by the same hyaline tissue; being here very narrow, this hyaline tissue, especially when examined by transmitted light, gives to the calyx as a whole the appearance of being 10-nerved at the base. The hyaline web uniting the rigid glumaceous sepals is readily torn; this may explain the statement that the calyx is deeply 5-fid. It is, however, in all the species, rather shallowly 5-fid.

CERATOSTIGMA Bunge (1834).

Enum. Pl. Chin. 55; Endl. Gen. n. 2175; Meisn. Gen. i. 315 and ii. 227; Benth. & Hook. f. Gen. Pl. ii. 628; Oliv. in Flor. Trop. Afr. iii. 487; Clarke in Flor. Brit. Ind. iii. 481; Pax in Engl. Nat. Pflanzenfam. iv. 1, 122.

Valoradia Hochst. (1842). Flora. xxv. 2, 239; Meisn. Gen. Add. 368; Boiss. in DC. Prod. xii. 694; Hook. in Bot. Mag. sub t. 4487.

Calyx anguste tubulosus, breviter 5-fidus e sepalis 5 glumaceis angustis strictis conniventibus compositus; sepala singula 1-nervia, nervis in mucronem acicularem excurrentibus, valvatim disposita marginibus continguis membranâ tenue hyalinâ enervi longitudinaliter 2-plicatâ fere prorsus unitis. *Corolla* hypocraterimorpha tubo elongato calycem superante, limbo patente breviter 5-lobo, lobis obovatis obtusis retusisve, contortis, nervis 5 parum incrassatis corollam a basi ad sinus interlobulares usque percurrentibus. *Stamina* 5 corollæ lobis opposita, tubo parum supra medium affixa; filamenta filiformia; antheræ subexsertæ oblongo-lineares, versatiles, basi discretæ, a latere longitudinaliter apertæ. *Ovarium* oblongum plus minusve 5-gonum vel 5-sulcatum, apice conicum, 1-loculare; stylus terminalis filiformis, apice in ramos 5 introrsum papilloso-stigmaticos, alabastro dextrorsum contortos, mox explanatos divisus; ovulum 1. *Capsula* calyce inclusa, ima basi circumscissa, in valvas 5 a basi ad apicem versus fissilis; albumen parcum. *Frutices* vel *suffrutices*, innovationibus persistentibus vel herbaceis;

divaricato-ramosi; erecti, patuli vel rarissime scandentes; glabri, villosi vel strigosi. *Folia* alterna, margine sæpissime setoso-ciliata. *Flores* bracteati bracteâ concavâ, et 2-bracteolati bracteolis laterali-bus, carinato-plicatis, bracteas fere æquantibus, in capitula termi-nalia vel axillaria bracteis paucis brevioribus vacuis cincta congesti. Species 7-8, 2-3 Africanæ; ceteræ Himalaicæ, Tibetiæ, Sinenses vel Indo-sinenses.

Innovationes e basi perenne lignoso herbaceæ, annuæ; alabastra esquamata; capitula terminalia et axillaria:—

Folia margine ciliato-setoso excepto utrinque glabra

1. *C. plumbaginoides*.

Folia utrinque setosa vel scabrida . . . 2. *C. asperrimum*.

Innovationes e ramis demum lignosæ, persistentes; alabastra squamis coriaceis, diu apud innovationis basem persistenti-bus induta:—

Squamæ alabastra obtegentes vel innovationum basi-

bus obsitæ numerosæ aciculares, fere pungentes;

folia utrinque glabra; capitula terminalia; cor-

tex fissilis; suffrutex intricate ramosus . . . 3. *C. ulicinum*.

Squamæ alabastra obtegentes vel innovationum basibus obsitæ paucae ovatae; cortex haud fissus:—

Frutices erecti; capitula terminalia et axillaria:—

Folia supra glabra vel nervis tantum plus minus

hirsuta; subtus ramulisque sparse adpresse

hirsuta 4. *C. minus*.

Folia utrinque ramulisque dense patente fulvo-

hirsuta 5. *C. Griffithii*.

Frutices patuli vel scandentes; folia utrinque ramulisque sparse adpresse setosa:—

Capitula terminalia et axillaria; bracteæ, bracte-

olæ calycisque lobi vix pungentes; frutex

patulus 6. *C. abyssinicum*.

Capitula terminalia; bracteæ, bracteolæ calycis-

que lobi pungentes; frutex scandens . . . 7. *C. speciosum*.

1. CERATOSTIGMA PLUMBAGINOIDES Bunge, Enum. Pl. Chin. 55 (1834); Hemsl. in Journ. Linn. Soc. xxvi. 36 (1889), loc. "Yunnan" excludend.

Plumbago Larpentæ Lind. Gard. Chron. vii. 732 cum ic. (1847); Mohl & Schlecht. Bot. Zeit. vi. 160 (1848); Lem. Flor. des Serres, iv. t. 307 (1848); Boiss. in DC. Prod. xii. 694 (1848).

Valoradia plumbaginoides Boiss. in DC. Prod. xii. 695 (1848); Hook. Bot. Mag. t. 4487 (1850); Maxim. Ind. Pek. in Prim. Flor. Amur. 476 (1859).

China: prope Pekin, Bunge! Shanghai, Fortune, 33! Chusan, Cantor!

2. **Ceratostigma asperrimum** Stapf MSS. in Herb. Kew.

Frutex humilis ramis sparse foliatis, ramulis angulatis parce adpresse puberulis. *Innovationes* basi esquamatae, foliola 2-3 basalia foliis multo minora circumambitu tamen iis similia. *Folia* obovato-spathulata, alterna, basi longe et angustius cuneata, apice obtusa,

rigide chartacea, margine setis adpressis obsita, supra setis brevissimis sparsis scabrida, subtus pilis adpressis sparsis aspera, 40–50 mm. longa, 30–35 mm. lata. Florum *glomeruli* in axillis superioribus terminalesque dispositi. *Bracteæ* ovato-acuminatæ extus densius pubescentes. *Calyx* 10–11 mm. longus. *C. plumbaginoides* Coll. & Hemsl. Journ. Linn. Soc. xxviii. 81 (1890) vix Bunge.

Indo-China: in collibus Birmanniæ Shan, apud Tounggyi, 6000 p.s.m., *Collett*!

Species *C. plumbaginoidi* proxima, foliis asperis tamen statim differt.

3. **Ceratostigma ulicinum** Prain. *Frutex* humilis, ramis dense foliatis intricatis, cortice fisso; ramulis subangulatis cortice rufescentibus puberulis. *Innovationes* sæpius abortivæ, basi squamis numerosis subulatis rigidis pungentibus margine breviter spinuloso-setosis in folia normalia gradatim abeuntibus indutæ. *Folia* obovato-lanceolata, alterna, apice spinosa, margine spinuloso-serrata, utrinque glaberrima, 18–22 mm. longa, 5–7 mm. lata. Florum *glomeruli* omnes in capitula oblonga spiciformia terminalia congesti. *Bracteæ* ovato-lanceolatæ cuspidatæ margine spinuloso-setacæ; bracteolæ nervo medio extus parce spinuloso-setacæ, ceterum glabræ. *Calyx* 10–11 mm. longus.

Tibet: inter Phari et Shigatze, *Ujyen Gyatsko*! apud Gyantse, 13,200 p.s.m., *Walton*!

Species valde distincta, squamis numerosis acicularibus insignis.

4. **Ceratostigma minus** Stapf MSS. in Herb. Kew. *Frutex* 2–3-pedalis, ramosus, ramis densius foliatis virgatis, cortice haud fisso teretibus, ramulis cylindricis plus minusve adpresse strigosis. *Innovationes* basi squamis paucis triangulis coriaceis vaginiformibus parce setoso-hirsutis in folia normalia subito abeuntibus obsitæ. *Folia* obovata, alterna, apice mucronulata, margine spinuloso-setosa, supra glabra vel nervo medio nonnunquam etiam nervis lateralibus parce setosa, subtus sparse adpresse setoso-hirsuta, 20–26 mm. longa, 9–16 mm. lata. Florum *glomeruli* in axillis superioribus terminalesque dispositi. *Bracteæ* ovatæ acutæ margine setoso-cillatæ extus adpresse hirsutæ. *Calyx* 7–9 mm. longus. *C. plumbaginoides* Hemsl. Journ. Linn. Soc. xxvi. 36 (1889), quoad loc. Yunnan tantum, nec Bunge.

China: Yunnan; prope Mo-so-yn, *Delavay*! Mengtze, *Hancock*, 130! in loco vix certo, *Bulleyi mercen.*! in valle Tong et in locis aliis, *E. H. Wilson*! Szechuen; prope Ta-chien-lu, *Pratt*, 137! *Tibet*: Khamba-la, 16,000 p.s.m., *Walton*! inter Phari et Shigatze, *Ujyen Gyatsko*!

Species *C. Griffithii* valde accedens; floribus minoribus tomentoquo parciore et adpresso satis tamen discrepat.

5. **CERATOSTIGMA GRIFFITHII** C. B. Clarke in Hook. f. Flor. Brit. Ind. iii. 481 (1882).

Plumbago? Griff. Itin. 189 (1848).

Bootan: inter Woolooka et Lamnoo, frequens, 8000 p.s.m., *Griffith*, 1007! *Chumbi*: apud Paroo, 8000–9000 p.s.m., *Dunboo*

Speciei præcedenti affinis; differt floribus majoribus, tomento densiore patente, habitu robustiore.

6. *CERATOSTIGMA ABYSSINICUM* Aschers. in Schweinf. & Aschers. Aufzähl. Nil-Länd. 288 (1868); Oliv. in Flor. Trop. Afr. iii. 487 (1877).

Valoradia abyssinica Hochst. in Schimp. Un. It. n. 253, nomen (1840); in Flora, xxiv. Intell. Bl. 23, nomen (1841); in Flora, xxv. 2, 239 (1842); Boiss. in DC. Prod. xii. 695 (1848).

V. patula Hochst. in Flora, xxv. 2, 239 (1848), sec. Oliv. l. c.

Plumbago eglandulosa R. Br. in Salt, Voy. App. iv. p. lxiv, nomen (1814).

Abyssinia: loc. vix cert., *H. Salt*! in Herb. Mus. Brit. in monte Scholoda, *Schimper*, 253! Athena am Asaba, *Steudner*, 1329! Erithræa, prope Acrour, *Schweinfurth & Riva*, 1010!

7. *Ceratostigma speciosum* Prain. *Frutex* scandens, ramosus, ramis sparse foliatis, cortice haud fisso teretibus, ramulis subcylindricis densius adpresse fulvo-pubescentibus. *Innovationes* basi squamis paucis, ovatis, coriaceis, vaginæformibus, substrigosis, subito in folia normalia abeuntibus obsitæ. *Folia* obovata, alterna, apice abrupte acuminata, mucronata, basi cuneata, margine spinuloso-setosa, supra minute adpresse puberula, subtus adpresse strigosa, 30–40 mm. longa, 15–25 mm. lata. *Florum glomeruli* terminales vel subterminales. *Bracteæ* lanceolatae margine setosociliatæ, extus adpresse strigosæ. *Calyx* dentibus pungentibus, 18–20 mm. longus.

Somalia: in sepibus nemoribusque scandens, *Dna. Lort Phillips*! *Dna. Cole*! apud Hadrawal, *A. Donaldson Smith*!

Species *C. abyssinico* proxima; differt foliis latioribus, habitu scandente, tomento densiore, floribus manifeste majoribus, capitulis omnibus terminalibus subterminalibusve nullis plane axillaribus.

NOTES ON THE FLORA OF SUSSEX.—II.

By C. E. SALMON, F.L.S.

SINCE the publication of my Sussex list (Journ. Bot. 1901, 403), memoranda of various plants from that county have been steadily accumulating, and I venture to now record them ere they get completely out of hand.

The Rev. E. S. Marshall has already in these pages (1902, 213, and 1903, 227) contributed greatly to our knowledge of West Sussex plants, and Mr. W. Whitwell (*l. c.* 1902, 103) has explored the Horsted Keynes district in East Sussex.

As in my previous notes, I have endeavoured to reject localities already in print and easily accessible; from one book, however,—and that a scarce one it appears,—I have taken some extracts—*The Botany of the County of Sussex*, by T. H. Cooper, F.L.S., 1834.

Arnold's *Sussex Flora* (1887) makes use of many of Cooper's

records, but, curiously enough, omits some without any apparent reason; a few of these latter have been recently confirmed, and there seems no reason why many, at any rate, should not be accepted. Cooper himself says, "Those plants which have been stated to grow in Sussex, probably by mistake or of accidental occurrence, and now lost, or at most not recently met with, are distinguished by an asterisk. The remainder have been seen very lately." It must be recollected that this "very lately" is now seventy years ago!

The following observers have favoured me with notes or specimens:—

E.N.B. .	Rev. E. N. Bloomfield.	H.H. .	H. Hemmings.
H.G.B. .	Rev. H. G. Billingham.	T.H. .	T. Hilton.
A.B.C. .	Miss A. B. Cobbe.	W.E.N. .	W. E. Nicholson.
M.C. .	Miss M. Cobbe.	W.M.R. .	Rev. W. Moyle Rogers.
Cooper .	Cooper's <i>Bot. of Sussex</i> .	C.H.W. .	Rev. C. H. Waddell.
D. .	Mrs. Davy.	J.W.W. .	J. W. White.
E.E. .	Rev. E. Ellman.	My own records have no initials.	

The sign ! after a locality indicates that I have either seen the plant growing there, or a satisfactory herbarium example. An asterisk is placed before the name of species or variety when such is believed to be a new record for either East or West Sussex; when placed before a *number*, it indicates an additional district to those mentioned in Arnold's *Sussex Flora*, to which the numbers refer. Plants considered to be introduced are distinguished by the sign †.

Amongst the records that follow, these seem to be the most interesting:—*Draba muralis*, *Polygala ciliata*, *Sagina Reuteri*, *Ulex Gallii*, *Rubus sulcatus*, *R. Gelertii*, *R. serpens*, *Galium sylvestre*, *Senecio squalidus*, *Hieracium cantianum*, *Hypochaeris Balbisii*, *Gentiana præcox*, *Linaria repens*, *Utricularia neglecta*, *Carex Bænnighausiana*, *Polypogon littoralis*, *Festuca ciliata*, and *Bromus interruptus*.

These notes extend to the end of 1904.

I wish to thank the following botanists for kindly examining and naming many critical species:—Messrs. A. Bennett, H. W. Pugsley, J. Groves, F. N. Williams, Revs. E. S. Marshall, E. F. Linton, and W. Moyle Rogers; the last-named or Dr. Focke examined all Mr. White's *Rubi*, and Mr. Rogers has seen all the other plants of this genus from Sussex.

Anemone nemorosa L. var. **cærulea* Pritzel. IV. Cuckfield, growing with the white ones. Flowers of a distinct blue (not purple), which is retained when dried! 1903; D.

Adonis autumnalis L. IV. Between Seaford and Bishopstone, 1901; M. C.

Myosurus minimus L. I. Thorney Island! 1901; C. P. Hurst. *II. Near Poling Church! 1903; H. C. Miller. Near Angmering Church, 1903; H. G. B.

Ranunculus circinatus Sibth. V. Ditches near Pevensey Sluice, 1894.

R. heterophyllus Web. In my 1901 "Notes" I reported this

from "III. Fulking," and claimed its first appearance in E. Sussex. I find that Fulking is in Sussex West.

R. Baudotii Godr. V. Near Eastbourne; J. H. A. Jenner.

R. Lenormandi F. Schultz. I. Near Graffham, 1901.

R. Lingua L. V. Pevensey Level, by road to Wartling, 1904; H. G. B.

R. sardous Crantz. I. Bognor; M. C. IV. Rather common in fields near Cuckfield; D. V. Two places near Littleington, 1902.

R. parviflorus L. I. By a small pond by the roadside at Redford, 1903; A. J. Crosfield.

Helleborus viridis L. *III. Westend, Henfield; Woodmancote, in that part of the wood called Tenacre Shaw; by the footpath from Henfield to Blackstone, near Bilsborough; Cooper.

Aquilegia vulgaris L. I. Downs, Upwaltham and Cocking; H. G. B.

Papaver somniferum L. var. *hispidum* H. C. Wats. V. Field foot of Downs between Meads and Beachy Head! 1888; Roper.

P. Argemone L. *II. Field north of Horsham; J. W. W.

Fumaria Boræi Jord. var. **muraliformis* Cl. IV. Roadside, Maresfield! 1901; T. H.

F. confusa Jord. *III. Hove! 1903; T. H.

F. densiflora DC. V. Cow Gap, Beachy Head! 1872; Roper.

F. parviflora Lam. III. Corn-field, Race-hill, Brighton! 1904; T. H.

**Mathiola sinuata* R. Br. VI. Hastings; Cooper. Not seen recently, I believe.

Nasturtium palustre DC. II. West Chiltington! 1903; A. B. C. VII. Bewbush Mill-pond, 1902.

N. sylvestre Br. VI. Robertsbridge! 1887; R. Paulson.

N. amphibium R. Br. I. South Berstead; M. C.

**Barbarea intermedia* Bor. VI. Robertsbridge, 1890; W. M. R. Apparently an addition to East Sussex.

B. præcox R. Br. I. Midhurst, 1902. *IV. Buxted! 1902; W. E. N.

The "*B. stricta* or *intermedia*" of Mr. W. Whitwell's note in Journ. Bot. 1902, 104, from Horsted Keynes, must, I think, be placed as a form of *B. vulgaris*. In leaf and flower and pod Mr. Whitwell's plant—of which he kindly sent me examples—does not agree with either *stricta* or *intermedia*; and I quite think with Mr. F. A. Lees, who knows *B. stricta* well in Yorkshire, that this name should only be applied to the small-flowered plant with pods close-pressed to rachis, &c., which also occurs by the Thames near Kew.

Arabis hirsuta Scop. I. Near the lake, Arundel Park; M. C. Heyshott Down, 1901.

†**A. perfoliata* Lam. III. Barrow Hill, Henfield! 1901; T. H. Probably planted by Borrer.

Cardamine amara L. IV. Copyhold, Cuckfield, and near Sloop Inn, Lindfield, 1903; D. VII. Newbridge, Ashdown Forest, 1903.

C. flexuosa With. E. N. B. writes that the VI. record for this in Arnold's *Sussex Flora* is for "luxuriant *hirsuta* only," but I have this station in this district—Robertsbridge, 1890; W. M. R.

C. bulbifera R. Br. VI. Border of Kent and Sussex between Hawkhurst and Hurst Green; J. C. Melvill, c. 1882. "Has been found at Staplecross"; E. N. B. in litt.

†*Alyssum incanum* L. *III. Roedale, Brighton! 1903; T. H.

**Draba muralis* L. I. The Rev. H. G. Billingham reported this as having been found near Arundel in 1904, and very kindly accompanied me to the spot in May, 1905. It occurs in great abundance and is very luxuriant on and by an old wall near a farm on the outskirts of the town. If not native, it is difficult to realize how the plant came to this spot, unless purposely sown, as the species is not one grown in gardens for ornament or use. Its occurrence in Kent (Journ. Bot. 1899, 275) strengthens the idea that it may now be classed as a wild plant of Sussex also.

Sisymbrium officinale Scop. var. **leiocarpum* DC. I. West Wittering, 1902.

S. Sophia L. *I. Bognor! 1903: M. C.

†*S. pannonicum* Jacq. III. Southwick! 1896; and Riflebutt Road, Brighton! 1897; T. H.

Erysimum cheiranthoides L. I. Banks of Rother by Iping Mill and Woolbeding bridge; H. G. B.

†*E. perfoliatum* Crantz. *I. Bognor! 1903; A. B. C.

*†*Brassica adpressa* Boiss. IV. Glynde Chalk-pit! J. H. A. Jenner. Introduced with oil-cake, and well established.

Diplotaxis tenuifolia DC. *III. Mr. Hilton tells me that the specimens in Hb. Brighton representing the record from this division in Arnold's *Sussex Flora* belong properly to *D. muralis* and var. *Babingtonii*. I have, however, seen true *D. tenuifolia* from Roedean, Brighton, 1903; E. E. IV. Newhaven! 1901; T. H. Bishopstone! 1902; W. E. N.

Coronopus didymus Sm. I. Bognor; M. C. IV. Seaford; M. C.

Lepidium rudemale L. I. Bognor! 1903; M. C. Near Emsworth, 1903. *II. Houghton Bridge; D. *IV. Brickfield near Seaford! 1902; W. E. N. V. Eastbourne, 1901; D.

L. hirtum Sm. I think this deserves specific localities in Sussex, and can hardly be passed over as "Fields and waste places: com." (Arnold's *Sussex Flora*). I. West Wittering, 1902. III. Woodmancote and Henfield; Cooper. IV. Hedgebank, Blackboys, Framfield! 1903; W. E. N. V. Langley! 1903; T. H. VI. Hastings; Cooper.

†*L. Draba* L. *IV. Roadside, Hamsey! 1903; W. E. N. Seaford; M. C.

*†*Chorispora tenella* DC. III. By Custom House, Kingston! 1902; T. H.

*†*Erucastrum Pollichii* Spen. IV. Waste places in chalk-pits, Glynde! 1878-1901; J. H. A. Jenner. Introduced with imperfectly crushed oil-cake. Newhaven, 1899; W. E. N. V. Bexhill; W. M. R.

†*Rapistrum rugosum* All. *IV. Sandy ground on the golf-links, Seaford! 1902; W. E. N.

Crambe maritima L. III. Worthing; Cooper.

Helianthemum Chamæcistus Mill. *VI. Guestling. Nat. Hist. Hastings, Supp. i., 1883.

Viola palustris L. I. Midhurst Common, 1902. IV. Balcombe Forest; D.

V. silvestris Reich. *IV. Copyhold, Cuckfield; D.—f. *leucantha* G. Beck. III. New timber! 1901; T. H.

Polygala oxyptera Reichb. V. Downs, Wilmington! 1903; T. H. VI. St. Helen's Wood Road, Ore, 1887; R. Paulson.

P. serpyllacea Weihe var. **ciliata* Lebel. I. Barlavington and Graffham Downs, 1901. Additional to v.-c. 13. Evidently a very scarce variety, as a long search and a close examination of numberless individuals only produced a very few examples of this form. It is doubtful if this would not be better placed as a variety of *P. oxyptera* Reichb. See Journ. Bot. 1896, 399. V. Downs, Jevington! 1900; T. H.

P. calcarea F. Schultz. Mr. Hilton tells me that the Piecombe locality (Journ. Bot. 1901, 407) is in East and not West Sussex; but he has gathered it near Pangdean, to the west of the London Road, and this would be in the latter division (v.-c. 13).

Frankenia laevis L. VI. Pett, 1877; R. L. Hawkins.

Dianthus Armeria L. I. Pagham! 1903; M. C.

†*D. prolifer* L. IV. Edge of cornfield, Race-hill, Lewes! D.

†*Saponaria Vaccaria* L. *IV. Cultivated land by road to Newmarket Hill! 1901; T. H.

†*Silene conica* L. *III. Cultivated field, Race-hill, Brighton! 1902-4; T. H.

*†*S. italica* Pers. III. Henfield! escaped, 1894; T. H.

**S. dubia* Herb. IV. Downs between Hodshrove and Bevendean in three places, plentiful, and certainly native! 1896-1904; T. H. See Journ. Bot. 1905, 127.

*†*S. dichotoma* Ehrh. IV. Woodendean! 1901; T. H.

Cerastium quaternellum Fenzl. V. Downs, Eastbourne, and at Hurstmonceux; D.

C. tetrandrum Curtis. V. Bexhill; W. M. R.

C. arvense L. IV. Near Telscombe! 1903; Miss E. C. M. Boodle. Plentiful on a part of Cliff Hill, Lewes, 1902; H. H.

Stellaria aquatica Scop. I. Petworth; D. IV. Near river at Lindfield, 1901. VII. Buckhurst Park, 1904.

S. media Cyr. var. *Boræana* Jord. III. Shoreham Beach! 1902; T. H. *VI. Camber Sands, running into Kent! 1903; E. E.

Arenaria peploides L. I. Climping; M. C.

Sagina ciliata Fr. V. Near Bo-Peep; W. M. R. *VI. Pett Beach! 1878; E. N. B.

*†*S. Reuteri* Boiss. III. Bank facing sea, Portslade! 1903; T. H. Norfolk Bridge, Shoreham! 1903-4; T. H. An interesting addition to the Sussex list, although no doubt here accidentally introduced, of a plant said to be native only in Spain. (See Journ. Bot. 1894, 181; 1896, 367; 1897, 409.)

S. subulata Presl. II. Chiltington Common! 1903; A. B. C.

S. nodosa Fenzl. *II. Chiltington Common! 1903; A. B. C. Storrington Downs; M. C. — Var. *glandulosa* Bess. III. Downs

above Saddlescombe! and near golf-links, Dyke Hill! 1904; T. H. IV. By Lewes racecourse! 1904; T. H.

**Spergula sativa* Boenn. III. Aldrington Wharf! 1902; T. H.

Ruda marina Dum. var. **glandulosa* Druce. III. Side of river, Old Shoreham! 1901; T. H.

Montia fontana L. var. *erecta* Pers. *VII. Newbridge, Ashdown Forest, 1903.

Elatine hexandra DC. VII. Bewbush Pond, 1902. Pond, Withyham, 1904.

Hypericum Androsæmum L. I. Near Fernhurst, 1902; A. J. Crosfield. V. Hollington; H. Friend. VI. Netherfield; H. Friend. Guestling; E. N. B.

H. dubium Leers. VII. Between Faygate and Bewbush Mill, 1902.

H. hirsutum L. VI. Hurst Green. Nat. Hist. Hastings, Supp. i., 1883. E. N. B. tells me that this plant is scarce in the Hastings district.

Althæa officinalis L. I. Shore of Chichester Channel, opposite Birdham, 1901.

*†*Malva verticillata* L. IV. Lewes, 1900; E. E.

M. borealis Wall. *VI. Great Maxfield Farm, Guestling! 1903; E. N. B.

Radiola linoides Roth. I. On the common, Fittleworth, 1904; D. II. Chiltington and Wiggonholt Commons! 1903; A. B. C. Near St Leonards House, 1903. VII. Buckhurst Park, 1904.

Linum angustifolium Huds. I. Bognor; M. C. IV. Seaford; M. C.

†*L. usitatissimum* L. I. Bognor; M. C.

*†*Geranium sanguineum* L. VII. Near Nutley, 1901-2; W. E. N.

†*G. phæum* L. I. Iping Churchyard, 1904; H. G. B.

G. pratense L. *I. Between Linchmere and Fernhurst; W. M. R.

G. pyrenaicum Burm. fil. I. Elsted, bank near church, 1904; H. G. B.

G. pusillum L. III. Roadside, Ditchling; T. H.

G. columbinum L. IV. Copyhold, Cuckfield; D. V. Bexhill. Nat. Hist. Hastings, Supp. iii., 1897.

G. lucidum L. I. Bognor! Eight or ten plants in a new road, 1903-4; A. B. C.

G. Robertianum L. var. *purpureum*, auct. angl. VI. Rye Harbour; E. N. B. in litt.

Erodium maritimum L'Hérit. I. Shore near Bracklesham (Dillenius); but Borrer could not find it there; Cooper.

E. moschatum L'Hérit. *II. West end of Pulborough; Cooper.

Oxalis Acetosella L. var. **subpurpurascens* DC. VI. East of Wadhurst, 1904; E. E.

*†*O. stricta* L. IV. In an orchard, Cuckfield; Cooper.

Rhamnus catharticus L. II. One hedge near Slinfold; J. W. W. VI. Westfield, 1876; J. H. A. Jenner.

R. frangula L. I. Between Linchmere and Fernhurst, and at Aldworth, Blackdown; W. M. R. *II. Copses between Rudgwick and Rowhook; J. W. W. V. St. Leonards; W. M. R. VII. East Grinstead, 1904; C. H. W.

**Ulex Gallii* Planch. II. West Chiltington Common! 1903; T. H. An interesting addition to v.-c. 13.

U. nanus Forster. I. Aldworth, Blackdown, and Shottermill Common; W. M. R. *II. Greatham Common! 1903; A. B. C.

Medicago lupulina L. var. *Willdenowiana* Koch. I. Midhurst, 1902.

M. denticulata Willd. *II. Littlehampton; M. C. V. Beach beyond Marina, St. Leonards, 1886; E. de Crespigny. VI. Rye, along the coast eastward towards New Romney; Cooper.—Var. **apiculata* Willd. I. Bognor; M. C.

†*Melilotus alba* Desr. I. Pagham; M. C. IV. Seaford; M. C. V. St. Leonards; Fox Wilson.

†*M. indica* All. *I. Bognor! 1903; M. C.

Trifolium striatum L. I. Pagham; M. C.

†*T. resupinatum* L. *I. Bognor, 1902; M. C.

*†*T. agrarium* L. II. Roadside near St. Leonards House, 1903.

T. filiforme L. I. Appledram and Bognor; M. C. IV. Buxted, 1902. V. Near Bo-Peep; W. M. R.

*†*T. spumosum* L. III. South of Lighthouse, Kingston! 1898; T. H.

Lotus corniculatus L. var. **villosus* Ser. III. Shoreham! 1900; T. H. ("Not extreme," E. F. Linton). VI. Cliffs near Fairlight, 1887; R. Paulson.

L. tenuis W. & K. VI. Near Three Oaks, Guestling! E. N. B. in litt.

Ornithopus perpusillus L. I. Aldworth, Blackdown; W. M. R. IV. Chailey Common; D. Rocky ground near Maresfield, 1902.

†*Vicia lutea* L. *I. New road, Bognor, 1902; M. C. III. Bank by Aldrington Canal towards Southwick; H. H. Cultivated land, Henfield! 1903; E. E.

V. angustifolia L. var. *Bobartii* Koch. *VII. Ifield; E. E.

*†*V. melanops* Sibth. III. Cultivated land near Stanmer! 1901; T. H.

†*V. varia* Host. var. **villosa* Roth. III. Cornfield, Race-hill, Brighton! 1901; T. H. IV. With lucerne, Warren Farm! 1903; E. E.

*†*Lathyrus Cicera* L. III. Near Stanmer! 1896; T. H.

L. Aphaca III. Between New Shoreham and Old Buckingham; Cooper.

Prunus insititia Huds. I. Between Linchmere and Fernhurst; W. M. R. VI. Robertsbridge, 1890; W. M. R.

P. domestica L. III. Twineham, wild; W. Borrer, jun., 1806; Garry, Journ. Bot. Supp. 1903, 56.

P. Cerasus L. III. London Road, Clayton! 1902; T. H.

*†*P. Padus* L. IV. Near Lewes, planted; D.

Rubus idæus L. II. Storrington Downs; M. C.

**R. sulcatus* Vest. VII. Roadside near Wych Cross, Ashdown Forest, 1904; C. H. W. "Probably weak shade-grown," W. M. R. New to Sussex.

R. plicatus W. & N. VII. Ashdown Forest! 1901; T. H. "Certainly under *R. plicatus*, and perhaps a shade-grown form of var. *hemistemon*, without the characteristic short stamens and grey hairy leaf clothing"; W. M. R.

R. holerythros Focke. *II. St. Leonards Forest towards Colgate; J. W. W. Heath and Washington Commons! 1904; T. H. IV. Slaugham Common! 1901; T. H. VII. Buckhurst Park, Withyham, 1904.

R. carpinifolius W. & N. I. Midhurst Common, 1902. II. West Chiltington Common, and at Colgate; J. W. W.

R. Lindleyanus Lees. II. Rare, near the Surrey border east of Rudgwick; J. W. W.

R. erythrinus Genev. f. **glandulosa*. III. Downs, Patcham! 1904; T. H.

R. rhamnifolius W. & N. II. Rare, near Rudgwick; J. W. W. III. Henfield Common! 1904; T. H. *IV. Plumpton Green! 1904; T. H.

R. pulcherrimus Neum. II. Plentiful on the outskirts of St. Leonards Forest, and often with septennate leaves; J. W. W. IV. Downs, Telscombe! 1901; T. H.

R. dumnoniensis Bab. *II. Washington Common! 1904; T. H.

R. argentatus P. J. Muell. *II. Thakeham Road! 1904; T. H. IV. Near Horsted Keynes; 1901; T. H. "Somewhat intermediate between type and var. *robustus*, being on the whole nearer to the variety," W. M. R. — Var. **robustus* P. J. Muell. IV. Lane from Streat to Plumpton Green! 1904; T. H.

R. pubescens Weihe. *II. Frequent in hedges between Rudgwick and Rowhook, and "exceptionally good *pubescens*" (Focke) about a mile east of Rudgwick; J. W. W. — Var. *subinermis* Rogers. *II. In plenty on outskirts of St. Leonards Forest; J. W. W. IV. Near Cockhais Mill, Lindfield, and lane near Sheffield Park Arms! 1902; R. S. Standen. *VII. West Hoathly! 1901; T. H.

R. macrophyllus Weihe. II. Roadside hedge, Rudgwick; J. W. W.

R. leucostachys × *rusticanus*. III. Hollingbury Park and downs, Pangdean! 1904; T. H. VII. Ashdown Forest, near Forest Row, 1904; C. H. W.

**R. Gelertii* Frider. III. Lane, Henfield! 1901; T. H. New to West Sussex. IV. Roadside, Woodendean! 1901; T. H. Warren Farm and near Wivelsfield railway station! 1903; T. H.

R. anglosaxonicus Gelert var. **raduloides* Rogers. III. Henfield Common! 1901; T. H. — Var. **setulosus* Rogers. IV. Lane from Streat to Plumpton! 1901; T. H.

R. infestus Weihe. *VII. Near Wych Cross, Ashdown Forest, 1904; C. H. W.

R. radula Weihe. *II. Between Slinfold and Lower Broadbridge; J. W. W. — Var. *anglicanus* Rogers. *IV. Piltdown! 1902; R. S. Standen.

R. echinatus Lindl. *II. Hedge in lane a quarter of a mile east of Rudgwick Church; J. W. W.

R. rudis W. & N. *II. Between Slinfold and Theale; J. W. W. *III. Henfield Common and by path to Buncton Chapel! 1901; T. H.

R. Babingtonii Bell Salt. I. Midhurst Common, 1902. *II. Abundant between the Dépôt Road, Horsham, and St. Leonards, and in Wimblehurst Road; J. W. W. *III. Downs near the Dyke!

1903; T. H. Burrow Hill, Henfield! 1904; T. H. (The latter "a form or hybrid," W. M. R.) IV. Kenwards, near Lindfield! 1902; R. S. Standen. Lane from Streat to Plumpton Green! 1904; T. H. (The latter is "a form with very slight glandular development on panicle," W. M. R.)

R. mutabilis Genev. *II. Hedge in lane a quarter of a mile east of Rudgwick Church; J. W. W.

**R. scaber* W. & N. VII. Roadside, Ashdown Forest, between Forest Row and Wych Cross, 1904; C. H. W. "A very prickly form," W. M. R. New to East Sussex.

R. foliosus W. & N. II. St. Leonards Forest; J. W. W. IV. Broadhurst Manor Farm, near Horsted Keynes! 1903; R. S. Standen. Wood, Plumpton Green! 1904; T. H.

R. rosaceus W. & N. II. Coppice hedge at Lower Broadbridge, Slinfold parish; J. W. W. — Var. *hystrix* W. & N. I. Near Burton Mill, 1902. II. Roadside at Rudgwick; J. W. W. — Var. *infecundus* Rogers. I. Near Burton Mill, 1902.

R. adornatus P. J. Muell. II. Roadside hedge, Hurst Road, Horsham, and at Holmbush; J. W. W.

R. Koehleri var. *cognatus* N. E. Br. III. Hedge, Henfield Common! and lane south of Horeham Common! 1901; T. H.

R. Marshalli F. & R. *II. Roadside, Colgate; J. W. W.

R. Bellardi W. & N. *II. Coppice on Sansom's Farm, Rudgwick; J. W. W.

**R. serpens* Weihe. II. Near St. Leonards House, 1903. New to West Sussex.

R. dumetorum W. & N. I. Midhurst Common, 1902. III. Hedge near Cuckfield! 1901; T. H. IV. Nightingale hollow, Kenwards, near Lindfield! 1902; R. S. Standen. — *a. ferox* Weihe. III. Lane out of Montpelier Road, Hove! 1901; T. H. — *β. diversifolius* Lindl. II. Abundant about Horsham; J. W. W.

R. corylifolius Sm. *a. sublustris* Lees. III. Rock Common! 1904; T. H. *β. cyclophyllus* Lindeb. VII. Withyham, 1904.

R. Balfourianus Blox. II. Hedge close to Rudgwick churchyard; J. W. W. VII. Hartfield, 1904; C. H. W.

Geum rivale L. I. Near Stedham Mill, 1904; H. G. B. Funtingdon; Cooper.

*†*Potentilla norvegica* L. III. Hove! 1904; T. H.

P. argentea L. I. Near Burton Mill, 1902.

Agrimonia odorata Mill. I. Shottermill Common; W. M. R. *VII. Forest near Worth, 1904; C. H. W. Between Faygate and Bewbush Mill, 1902.

Alchemilla vulgaris L. var. *alpestris* Schmidt. IV. With Mr. W. E. Nicholson's help I was enabled to see this in 1902 growing in E. Jenner's locality in Arnold's *Sussex Flora*, where it is rather scarce and dwarf, and we were also pleased to see it growing very fine and tall by the roadside near Maresfield in other spot.

Poterium muricatum Spach. var. *platylophum* Jord. *III. Cultivated land, Hollingbury Hill! 1903; E. E.

Rosa tomentosa Sm. IV. Bank of Ouse near railway viaduct, beyond Haywards Heath! 1902; H. H.

R. micrantha Sm. II. Slinfold and Rudgwick; J. W. W. VII. Buckhurst Park, 1904.

R. obtusifolia Desv. I. Between Linchmere and Fernhurst and at Shottermill Common; W. M. R. Midhurst Common, 1902. II. Roadside at Rowhook and near Rudgwick; J. W. W. — Var. *tomentella* Leman. *II. Field hedge, Rudgwick; J. W. W.

R. canina L. *α. lutetiana* Leman. *II. Common about Rudgwick; J. W. W. — *f. andegavensis* Bast. *II. Field hedge, Slinfold; J. W. W. — *ε. dumalis* Bechst. *II. Common about Rudgwick; J. W. W. — *ι. urbica* Leman. *II. Broadbridge Farm, Horsham, and at Slinfold; J. W. W. — *κ. arvatica* Baker. *II. Rudgwick; J. W. W.

Pyrus torminalis Ehrh. VI. Dallington Forest and Netherfield. Nat. Hist. Hastings, Supp. iii. 1897.

P. communis L. IV. Wild, Cuckfield; W. Borrer, jun, 1806; Garry, Journ. Bot. 1903, Supp. 70.

P. germanica Hook. fil. III. Two places at Henfield, and one at Hurstperpoint; Cooper. V. In hedges, Ashburnham; Cooper.

*†*Crataegus Pyracantha* L. IV. Steep slope of chalk down near Offham, far from cultivation! 1901; W. E. N.

Cotyledon Umbilicus L. I. Climping; M. C.

Sedum album L. I. Wall of farm near Chichester; M. C.

S. anglicum Huds. *II. Littlehampton; M. C.

S. reflexum L. I. Midhurst, 1902.

*†*S. stellatum* L. III. Abundant on a bank at Barrow Hill, Henfield! 1892. Probably introduced by Borrer; T. H.

Drosera intermedia Hayne. I. Redford Common; H. G. B.

Hippuris vulgaris L. I. Swanbourne Lake, Arundel; M. C.

Callitriche obtusangula Le Gall. I. Near Earnley, 1901.

C. hamulata Kuetz. *VI. Fairlight; E. N. B.

C. truncata Guss. II. In *Sussex Flora* Arun district only is indicated; a fuller description of the locality reads, "Deep ditch between Amberley Castle and Wild Brook," W. Borrer, 1826 (Garry in Journ. Bot. Supp. 1904, 167).

Peplis Portula L. *II. St. Leonards Forest, 1903. VII. Bewbush Mill-pond, 1902.

Epilobium angustifolium L. V. By stream north-west of Beech Mill, near Catsfield; E. S. Salmon. VI. Lamberhurst, near stone quarry, between hence and Crouch End; Cooper.

E. roseum Schreb. I. Duncton Common, 1901. III. Wiston! 1902; T. H. Wood near Little Ease Mill-pond, 1903.

E. obscurum Schreb. I. Between Linchmere and Fernhurst; W. M. R. V. Bexhill and St. Leonards; W. M. R. *VII. Withyham, 1904.

E. montanum × *obscurum*. VII. Crawley, 1904.

Ludwigia apetala Wallr. IV. I could not see this at Little Ease Mill-pond in 1903. See Journ. Bot. 1903, 103.

†*Oenothera biennis* L. I. Field near Woolbeding; H. G. B. Midhurst Common, in two or three places, 1902.

Eryngium maritimum L. I. Between Earnley and Selsey Bill, 1901.

Conium maculatum L. VI. Winchelsea, 1886; E. de Crespigny.
Apium inundatum Reichb. fil. IV. Pond near Chailey Common; D.

†*Carum Carvi* L. *I. Bognor; M. C. *III. Whitehawk Down, Brighton! 1901; T. H.

C. segetum B. & H. III. Shoreham; M. C. IV. Seaford; M. C.

Ægopodium Podagraria L. I. Shottermill Common; W. M. R.
 VII. Worth; H. F. Parsons.

Pimpinella Saxifraga L. var. **dissecta* With. III. Race-hill, Brighton! 1904; T. H.

P. major Huds. V. Coppice, Wannock! E. E.

Crithmum maritimum L. I. Thorney Island, 1903.

Ænanthe fistulosa L. I. Between Sidlesham and Pagham, 1901.
 Midhurst Common, 1902.

Æ. pimpinelloides L. I. Near Marker Point, Thorney, 1903.

Æ. Phellandrium Lam. IV. Pond at Copyhold, Cuckfield; D.
 VII. Bewbush Mill-pond, 1902.

Caucalis nodosa Scop. I. Thorney Island, 1903.

Sambucus Ebulus L. IV. Wellingham, 1838; Rickman Herb.
 at Technical School, Brighton.

Viburnum Opulus L. III. About Steyning; H. H. V. St. Leonards; W. M. R.

Galium Mollugo × *verum*. III. Coast, Aldrington, with parents! 1901; T. H.

**G. sylvestre* Poll. III. Bank by a drive cut through chalk twenty years or so ago at Withdean! 1902; H. H. An addition to East Sussex; but it would be satisfactory to find the plant on *untouched* ground in the vicinity. Mr. Hemmings informs me that the bank now (1905) forms part of a garden of a "desirable villa residence"!

G. tricornis Stokes. IV. Cornfields near Newhaven; M. C.

Asperula odorata L. IV. Copyhold, Cuckfield, and between Hayward's Heath and St. John's Common; D. VI. Near Rye; Mrs. J. Taylor.

Valeriana dioica L. IV. Sloop Inn, Lindfield; D.

V. Mikanii Syme. II. Canal-bed near Loxwood, 1902. *III. Foot of Chanctonbury Hill! 1902; T. H. *IV. On chalk above Plump-ton; E. E. *VII. Faygate, 1904.

Valerianella dentata Poll. IV. Near Nether Walstead Farm, Lindfield, 1901.

Dipsacus pilosus L. III. Between Itchenfield and Shipley J. W. W.

Scabiosa Columbaria L. II. Storrington Downs, very abundant; M. C.

Aster Tripolium L. var. *discoideus* Hook. *I. Thorney Island, abundant, 1903. Possibly a state only, and not a true variety.

†*Erigeron canadense* L. *I. Aldworth, Blackdown; W. M. R.

E. acre L. IV. Seaford; M. C. Railway-banks near Horsted Keynes; D. *VII. Near East Grinstead; D.

Filago minima Fr. I. Linchmore Common; W. M. R.
 II. Chiltington Common; D. Storrington; M. C.

Gnaphalium uliginosum L. var. **pilulare* Wahlenb. I. Aldingbourne. Roadside near Nyetimber, 1904.

G. sylvaticum L. I. Aldworth, Blackdown; W. M. R. VII. Crowborough; M. C.

Inula Helenium L. III. Patch by roadside between Itchenfield and Shipley; J. W. W. IV. Plumpton, looking native; E. E.

I. Conyza DC. I. Midhurst, 1902.

Pulicaria vulgaris Gaertn. III. Margin of pond, Thakeham! 1904; T. H.

Bidens cernua L. III. Near Henfield; H. H. IV. Hamsey; H. H. *VII. Bewbush Mill-pond, 1902.

B. tripartita L. *VII. Bewbush Mill-pond, 1902.

Achillea Ptarmica L. I. Linchmore Common; W. M. R. II. West Chiltington and Storrington, 1903; A. B. C. IV. Copyhold, Cuckfield; D.

Chrysanthemum segetum L. I. Shottermill Common; W. M. R.

†*C. Parthenium* Pers. *II. Chiltington; M. C. III. Near Thakeham, on a high roadside bank, 1904; T. H. V. Bexhill; W. M. R.

†*Matricaria discoidea* L. *III. Portslade! 1902; T. H.

Artemisia Absinthium L. V. Bo-peep. Nat. Hist. Hastings, Supp. iii., 1897.

Petasites officinalis Moench. *VII. Brambletye; D.

Senecio sylvaticus L. I. Shottermill and Linchmore Commons; W. M. R. II. Storrington; M. C. III. Shoreham shingles; M. C. V. Bexhill; W. M. R.

*†*S. squalidus* L. I. Chichester north walls, abundant! 1903; A. B. C.

S. palustris DC. II. There is a specimen from Amberley in Herb. Brit. Mus. (ex Herb. Rand), collected by Dr. Manningham in 1725. This probably has long been lost by drainage: Amberley Wild Brooks was formerly much more of a morass than it is now. See Journ. Bot. 1903, 408.

S. campestris DC. IV. Near Telscombe! 1903; Miss E. C. M. Boodle.

Carlina vulgaris L. IV. Chailey Common; D.

Cardus pycnocephalus L. I. Selsey, 1901. V. Near Bo-peep; W. M. R.

C. crispus × *nutans*. I. Halnaker Hill, 1904. *III. Patcham! 1902, and Saddlescombe! 1903; T. H.

C. acanthoides L. III. Saddlescombe! 1901; T. H. Dr. F. N. Williams, who named the example, wrote: "A species quite distinct from *C. crispus*. *Folia subtus valde nervosa, venis solum tomentellis*."

C. pratensis Willd. I. Redford Common; H. G. B. IV. Balcombe Forest; H. F. Parsons. Near Nether Walstead Farm, Lindfield, 1901. A luxuriant form with tall stems, cut leaves, non-solitary heads, and numerous stem-leaves. It may be the "*pseudo-Forsteri*" of London, Cat. B. Pl. ed. 2, 1847; see Wats. Bot. Club Rep. 1902, 15.

Onopordon Acanthium L. I. Top of Pound Common, Woolbeding; H. G. B.

†*Mariana lactea* Hill. I. Bognor; M. C. On road from Bury over the downs; H. G. B.

Serratula tinctoria L. II. Storrington; M. C. Roadside near Horsham, 1903. VII. Crowborough, very abundant; M. C.

Centaurea Cyanus L. *II. Clover-field, Loxwood, 1902. IV. Seaford; M. C.

C. Calcitrapa L. IV. Seaford, near cemetery, and Bishopstone; M. C. Between Offham and Hamsey; D.

†*C. solstitialis* L. I. Bognor; D

Cichorium Intybus L. I. Field near Woolbeding, with *Enothera biennis*; H. G. B. IV. Field at Copyhold, Cuckfield; D. VI. Robertsbridge, casual, 1876; J. H. A. Jenner.

Picris hieracioides L. III. Clayton; H. H. IV. Seaford; M. C.

P. echioides L. IV. Seaford; M. C.

Crepis foetida L. Fields east and north of Brighton, and between Brighton and the Dyke! 1901; T. H.

C. taraxacifolia Thuill. IV. Telscombe! 1903; L. A. Boodle.

†*C. setosa* Hall fil. *IV. Lewes, waste ground, by River Ouse! 1902; W. E. N. III. Field of sainfoin by road to Newmarket Hill! 1901 and 1903; T. H.

C. virens L. var. **agrestis* W. & K. V. Littlington! 1900; T. H.

C. biennis L. III. Near Ditchling Common! 1902; H. H. *IV. Lane and fields, Copyhold, Cuckfield! 1903; D.

Hieracium murorum L. var. *pellucidum* Laestad. *III. Road from Preston to Dyke Road! 1903; T. H. Withdean! 1902; H. H.—Var. **lepistodes* Johanss. III. Bank, Withdean! 1902; T. H.

H. vulgatum Fr. var. *maculatum* Sm. *IV. Handcross Hill! 1903; and near Lindfield, abundant! 1905; D.

H. rigidum Hartm. var. *acrifolium* Dahlst. VII. Near Tunbridge Wells! 1904; T. H.—Var. *tridentatum* Fr. *VII. Roadside near Wych Cross on road to Nutley! 1904; C. H. W.

**H. cantianum* F. J. Hanb. VII. Near Tunbridge Wells! 1904; T. H.

H. boreale Fr. I. Linchmere to Fernhurst; W. M. R. *IV. Cuckfield! 1902; T. H. Path near Newick Station! 1902; H. H. V. St. Leonards; W. M. R. VII. Kingscote! 1895; T. H. Blackwell Hollow, East Grinstead! 1904; C. H. W.

H. umbellatum L. var. *coronopifolium* (Bernh.). VII. Roadside between East Grinstead and Dormans! and near Wych Cross on road to Nutley! 1904; C. H. W.

Hypochaeris glabra L. II. Chilmington Common! 1903; A. B. C.—Var. **Balbisii* Loisel. VI. Near Camber Castle, with type! 1903; D.

Taraxacum officinale Web. var. *erythrospermum* Andr. *III. Racehill, Brighton! 1902; T. H.—Var. *palustre* DC. *V. Bexhill; W. M. R.

Lactuca muralis Fresen. II. Chilmington; M. C. III. Withdean and Stanmer Park; H. H. VI. Abbey walls, Battle, 1876; J. H. A. Jenner.

(To be continued.)



THE NEW DIRECTOR OF KEW

THE NEW DIRECTOR OF KEW.

(WITH PORTRAIT.)

It is with feelings of unmixed pleasure that we record the appointment of Lieut.-Colonel David Prain to the directorate of Kew Gardens. For many years it has been our hope that the post when vacant would be filled by one who is in every way so admirably fitted for, and so thoroughly capable of renewing and continuing the best traditions of, this important position; and our satisfaction at this fulfilment of our hopes is increased by the friendliness which Dr. Prain has always shown towards this Journal—a friendliness which, by a happy coincidence, finds expression in his paper published in the present issue. The strained relations which have unhappily existed for some years between those responsible for the control of the two great herbaria of this country will be entirely removed by the appointment of one who has been a frequent and welcome visitor at both; and science cannot fail to be the gainer by the happier condition of affairs inaugurated by the advent of Dr. Prain.

Of his qualifications for the post it would be impertinent to speak. It may be noted, however, that his appointment as Director of the Botanical Survey of India and Superintendent of the Calcutta Gardens was preceded by his curatorship of Calcutta Herbarium, which dates from 1887; so that he has had experience in each branch of the work now entrusted to him. His numerous and important papers place him in the first rank of systematists, and more than justify the conviction that he will carry on the traditions of the two Hookers and Bentham, under whom Kew attained the position which has since been occupied by Berlin as the chief centre of systematic work. In some respects, indeed, Dr. Prain has an advantage over his illustrious predecessors in that he attaches greater importance than they did to what may be called the historical and literary side of systematic botany, and in his readiness to consult the National Herbarium, the neglect of which to some extent lessened the value of so important a work as the *Genera Plantarum* of Bentham and Hooker.

It must not, of course, be inferred from what has been said that the output of systematic work from Kew during the last twenty years has been wanting either in quantity or in quality. This is shown by the important Cape and Tropical African Floras, since their revival in 1896 and 1897 respectively; these are largely the work of the Kew staff, who have also contributed the descriptions to the *Botanical Magazine* and the *Icones Plantarum*, and have published numerous papers in the publications of the Linnean Society. The Floras and the later volumes of the journals mentioned have been issued under the editorship of the late Director, who, however, did not himself to any appreciable extent contribute to systematic botany; indeed, as we ventured to say when reviewing the official list of Kew publications, it can hardly be said that Sir W. Thiselton-Dyer's contributions to science have been such as might have been expected from a man of his undoubted capabilities. This no doubt

to some extent is due to the tax imposed upon his energies by the direction of the Royal Gardens, although his predecessor contrived to find time for most of his work in the *Genera Plantarum*. It may be, however, that on his retirement the late Director will emulate the energy of Sir Joseph Hooker, who has not ceased to continue his contributions to systematic botany, and now, in his eighty-eighth year, is engaged upon the Indian Balsams!

It may be hoped that Dr. Prain will resume the publication of the annual reports of Kew Gardens which were suspended during the last directorate, and for which the always erratic and now extinct *Bulletin of Miscellaneous Information* was in no way an adequate substitute. These reports in Sir Joseph Hooker's time gave a list of the annual contributions to the Herbarium, similar to that regularly issued by the Trustees of the British Museum for the national collections; since their cessation it has been impossible to obtain any record of these contributions. It may be confidently anticipated also that Dr. Prain will not allow many months to pass without renewing the publication of the 'Guide' to the Royal Gardens, which under the Hookers was rightly regarded as an indispensable adjunct to their usefulness, and met with a large sale; this was promised in the House of Commons for issue during the summer of 1892, but has not yet made its appearance.

We trust that Dr. Prain will retain, for the longest term which circumstances allow, the post to which he has been appointed, and that his directorate will mark an epoch in the history of botany in this country, and especially in that of the Royal Gardens, Kew.

The accompanying portrait is from a photograph by Bourne and Shepherd, India.

NEW OR RARE GAMOPETALÆ FROM TROPICAL AFRICA.

BY SPENCER LE M. MOORE, B.Sc., F.L.S.

I.—REV. W. E. TAYLOR'S BRITISH EAST AFRICAN PLANTS.

THE opportunity has recently been afforded me of examining some *Gamopetalæ* collected by the Rev. W. E. Taylor in the coastal region of Eastern Tropical Africa, especially among the Rabai hills, and presented to the British Museum. Mr. Taylor's collections have from time to time yielded a considerable percentage of novelties, greater perhaps than might have been expected considering the nearness to civilization, and accessibility of the district in question. The following plants are worthy of notice:—

Tricalysia ovalifolia Hiern in Fl. Trop. Afr. iii. 119.—Rabai, March and November.

Vernonia homilantha S. Moore in Journ. Bot. 1903, 138.—Frere Town, December. Native name, "Mlalapiri."

Blepharispermum zanguebaricum Oliv. & Hiern in Fl. Trop. Afr. iii. 336.—Rabai.

Coreopsis Taylora sp. nov. Verisimiliter perennis caule erecto valido nudo multistriato, ramulis gracilibus distanter foliosis glaber-

rimis, foliis petiolatis alte bipinnatifidis segmentis ultimis late linearibus apice subito acutatis omnimodo glaberrimis necnon glandulis nigris copiose instructis petiolis basi sæpissime pilosis, capitulis mediocribus in cymis elongatis paucicephalis digestis, pedunculis propriis capitula longe excedentibus gracilibus glabris, involucri 2-serialis glabri phyllis exterioribus lineari-lanceolatis acutis herbaceis quam interiora membranacea oblonga obtusa brevioribus, ligulis 8 luteis, acheniis compressis dimidio superiore eximie scabridis apice setuloso-ciliatis calvis vel aristulis 1 vel 2 brevissimis erecto- vel patenti- vel etiam recurvo-uncinulatis onustis sæpe vero nudis.

Hab. In the bed of a torrent in a ravine at Rabai, January.

Folia 3·0–4·0 cm. long., ultima equidem imminuta; segmenta foliorum ab inflorescentia remotorum 1·0–1·5 cm. long. et 0·2–0·25 cm. lat.; petioli graciles, 0·4–1·5 cm. long. Cymæ adusque 18·0 cm. long. Pedunculi proprii modice 4·0–7·0 cm. long. Capitula pansa circa 2·5 cm. diam. Involucri phylla exteriora 0·45 cm., interiora 0·7 cm. long., hæc fere 0·2 cm., illa modo 0·1 cm. lat. Ligulæ late oblongæ, apice 3-denticulatæ, 11-nerves, 1·3 cm. long. Receptaculi paleæ angustissime lineari-lanceolatæ, acutiusculæ, 0·4 cm. long. Achænia 0·5 cm. long., 0·08 cm. lat., in sicco grisea.

Nearest *C. exaristata* O. Hoffm., which is a glandular-pilose plant with differently divided leaves, a hairy involucre, entirely calvous nearly glabrous achenes, &c. The hooks, when they do occur, upon the awns are very curious; indeed, the plant might almost as well be considered a *Bidens*, but the habit is that of *Coreopsis*.

Gynura Taylora sp. nov. Foliis parvis brevipetiolatis ovatis acutiusculis basi late rotundatis truncatisve margine paucidentatis vel dentato-lobulatis tenuiter crassiusculis glabris petiolis haud auriculatis, capitulis parvis homogamis circa 25-florescentibus in corymbo brevi laxo paucicephalo frequenter bracteato glabro digestis, pedunculis propriis gracilibus involucrum æquantibus excedentibusve, involucri late cylindrici phyllis 8 oblongis obtusis margine membranaceis additis paucis linearibus calyculum brevem formantibus et in bracteas transeuntibus, corollis longe exsertis, antheris basi minutissime sagittulatis, achæniis nondum maturis cylindricis 10-striatis pilosis, pappi setis scabridis albis.

Hab. Rabai, December.

Folia 2·5–4·5 cm. long., $\pm$ 1·5 cm. lat.; petioli 0·3–0·5 cm. long., crassiusculi. Corymbus 7·0 cm. long., circa 4·0 cm. diam. Bracteæ vetustiores 0·7–1·0 cm. long., lineares. Pedunculorum priorum bracteæ 0·2–0·3 cm. long. Involucrum 0·7 cm. long., vix 0·5 cm. diam.; phylla 0·15–0·2 cm. lat., in sicco læte brunnea, dorso lineata. Corollæ luteæ, vix 1·0 cm. long.; lobi lanceolati 0·15 cm. long. Styli rami cum appendicibus fere 0·3 cm. long. Achænia cruda 0·1 cm., pappus adusque 0·8 cm. long.

Looks somewhat like *G. scandens* O. Hoffm., which is a glandular-pubescent plant with heads half as large again, and very long style-arms. *G. Fischeri* O. Hoffm., a species I have not seen, has

auricled petioles, densely-massed heads with 35-florets, &c. As distinguished from its allies with eight broad involucral leaves, this can at once be told by its small shortly petioled leaves and the short flowering heads.

[*Vernonia Taylorii* S. Moore in Journ. Bot. 1900, 154, is *Gongrothamnus Hildebrandtii* Oliv. & Hiern. There is scarcely anything to distinguish *G. Hildebrandtii* from a *Vernonia*, except the colour of the corollas, which, in the case of Mr. Taylor's plant, has a distinct pinkish hue, and hence led to the mistake.]

Mimusops fruticosa Boj. Hist. Maur. 198.—Chiroroni, January.

M. Kilimandsharica Engl. in Monog. Sapot. Afr. 68 (e. descript.). Bed of torrent in ravine at Rabai, January.

Jasminum (§ UNIFOLIOLATÆ) **pulvilliferum**, sp. nov. Verisimiliter scandens ramis gracilibus teretibus griseo-pubescentibus cito glabris apicem versus crebro foliatis inferne ramulos breves patentissimos foliosos pubescentes gignantibus, foliis oppositis simplicibus parvis oblongo-ovatis ovatisve sæpissime obtuse acutis raro obtusis obtusissimisve basi rotundatis membranaceis haud nitentibus supra scabriusculo-puberulis subtus in axillis nervorum perspicue pulvillo-pubescentibus petiolis brevibus pubescentibus, floribus majusculis ad apicem ramorum necnon ramulorum 3-5-nis, pedunculis quam folia brevioribus, bracteis lineari-subulatis quam pedicelli abbreviati longioribus, calycis pubescentis lobis 6 lineari-setaceis tubum oblongo-obovoideum æquantibus, corollæ tubo sursum leviter amplificato limbi lobis anguste lineari-lanceolatis acutis tubum semiaquantibus, antheris breviter apiculatis.

Hab. Frere Town, December.

Folia modice 2.0-2.5 × 0.8-1.3 cm., in sicco brunnea; petioli 0.3 cm. long. Pedunculi 0.4-0.8 cm. long., pubescentes. Pedicelli 0.2 cm., bracteæ ± 0.4 cm. long. Calyx totus 0.5 cm. long., hujus lobi 0.25 cm. Corollæ tubus humectatus summum 2.5 cm. long., ima basi 0.2 cm. faucibus 0.35 cm. diam.; lobi 1.3 cm. long. Antheræ lineari-oblongæ, vix 0.5 cm. long.

Nearest *J. microphyllum* Baker, which has leaves without the characteristic pulvilli in the axils of the nerves on their under side, a different calyx, corolla with 8-10 lobes, &c.

Schizozygia coffeoides Baill. in Bull. Soc. Linn. Paris, i. 752.—No locality for this rare plant.

Microstephanus cernuus N. E. Br. in Kew Bull. 1895, 249. — Jomvu, December.

Mostuea syringæflora, sp. nov. Ramis gracilibus novellis pubescentibus paucifoliosis, foliis anguste oblongo-ovatis obtuse acutis sæpe brevissime cuspidulatis basin versus in petiolum brevem angustatis membranaceis utrinque nervis obscurissime puberulis exemptis glabris in sicco viridibus haud nitentibus subtus pallidioribus, stipulis vaginatis subtruncatis sc. apice ipso subito angustatis medio pubescentibus herbaceis ceterum membranaceis necnon glabris, cymis trifloris ramulos perbreves squamigeros terminantibus, pedunculis brevibus ut pedicelli gracillimi calyces multum excedentes puberulis, calycis minimi lobis inter se subæqualibus ovatis acutis albo-ciliatis, corollæ parvulæ infundibuliformis tubo calycem

4-plo excedente lobis 5 abbreviatis rotundatissimis, staminibus 5 æqualibus.

Hab. Rabai, November.

Rami circa 0.15 cm. diam. Ramuli florigeri circa 0.3 cm. long., in anthesi squamis parvis solummodo onusti vel foliorum maxime juvenilium par gignantes. Folia 2.5–3.2 × 1.0–1.5 cm.; petioli circa 0.2 cm. long. Stipulæ 0.15 cm. alt. Pedunculi summum 0.4 cm. long., sæpe vero breviores. Pedicelli 0.8 cm. long., divaricati vel ascendentes. Calyx 0.2 cm. long. Corollæ tubus 0.9 cm. long., basi 0.275 cm., faucibus 0.4 cm. diam. Filamenta crassiuscula, pubescentes; antheræ medium tubum attingentes, 0.1 cm. long. Ovarium 0.15 cm., stylus 0.5 cm., hujus rami 0.12 cm. ramulique 0.1 cm. long. De fructu sileo.

To be placed next *M. Zenkeri* Gilg. The habit, the long slender pedicels, and the very small calyx with strongly ciliate lobes are the chief points.

Thunbergia Hookeriana Lindau in Engl. Jahrb. xvii. Beibl. 41, 38.—Rabai, October. Flowers in a very early state, but identification certain.

Ruellia amabilis S. Moore in Journ. Bot. 1880, 7.—Kaya Bome, Rabai, April.

Sclerochiton Holstii C. B. Clarke in Fl. Trop. Afr. v. 111.—Torrent bed at Rabai, January.

In the *Flora of Tropical Africa* recorded only from German East Africa. It is now known also from British East Africa and the Uganda Protectorate.

S. Boivini C. B. Clarke in Fl. Trop. Afr. v. 110.—Ravine at Rabai, October. A large-leaved form (qy. var. ?), apparently the same as *Pseudoblepharis Heinsenii* Lindau, which Mr. Clarke merges in *S. Boivini*. The leaves reach 20 cm. in length by 9 cm. in breadth.

Lepidagathis hyssopifolia T. And. in Journ. Linn. Soc. Bot. vii. 34.—Old lake-bed behind Kaya Bome, Rabai, January.

Asystasiella africana, sp. nov. Foliis majusculis petiolatis ellipticis apice cuspidato-acuminatis basi longe attenuatis haud obliquis utrinque glaberrimis membranaceis in sicco olivaceo-griseis subtus pallidioribus, paniculo thyrsiformi saltem dum immaturo quam folia multo breviora cito glabrescente, bracteis bracteolisque parvis subulatis, pedicellis calycem æquantibus breviterve excedentibus glanduloso-puberulis, corollæ adhuc haud profecto evolutæ tubo sat lato superne amplificato lobis late oblongis obtusis extus obscure puberulis, antherarum loculis æqualibus omnibus basi breviter calcaratis, disco elevato incrassato, ovario lineari-oblongo superne in stylum elongatum desinente, stigmatibus capitellato, capsula —.

Hab. Frere Town, December.

Caulis saltem in sicco sursum aliquantulum compressus, bisulcatus sulcis nodisque puberulis, 0.15–0.2 cm. diam. Foliorum limbus 12.0–17.0 cm. long., 4.5–6.0 cm. lat.; costæ secundariæ utrinque 8, ascendenti-arcuatæ, marginem versus subito dichotomæ; petioli circa 2.5 cm. long., foll. summorum adusque 0.7 cm. reducti, glabri. Bracteolæ circa 0.25 cm. long. Calyx totus 0.4 cm., lobi

0.3 cm. long. Corolla nondum expansa 2.5 cm. long. Pollinis grana omnimodo iis *Asystasiellæ* specierum jam cognitarum similia. Antheræ 0.5 cm. long. Discus 0.12 cm. alt., 0.15 cm. lat. Ovarium basi 0.075 cm. lat., 0.3 cm. long; stylus 2.2 cm. long., apicem versus incurvus.

A remarkable plant, and the first of the genus to be reported from Africa. The corollas not being fully expanded, it is impossible to give measurements of their various parts. At first sight the corollas look unlike those of the other species, which are very long and slender in the tube, but some specimens of *A. atroviridis* Lindau have corollas in the same stage of anthesis, and looking much like those of the present plant.

According to the collector's note the native name is "Hindi."

Barleria submollis Lindau in Engl. Jahrb. xx. 21. — Rabai, January.

Vitex Mombassæ Vatke in Linnæa, xliii. 533. — Beni Rabai, February. Native name, "Mwevundu Mazi."

Orthosiphon (§ VIRGATI) *rabaiensis*, sp. nov. Caule gracili sparsim ramoso piloso-pubescente deinde glabrescente, foliis ovatis obtusissimis basi in petiolum sat longum subito angustatis utrinque puberulis margine crenatis, inflorescentia racemiformi folia excedente e verticillastris paucis 6-floris subdistantibus constitutis rhachi gracili piloso, bracteis parvulis ovatis obtusis haud coloratis cito decurvis diuscule persistentibus, pedicellis quam calyx brevioribus pubescentibus, floribus pro rata parvis cito nutantibus, calycis florentis pubescentis lobo postico rotundato apice brevissime apiculato lobis lateralibus triangularibus acuminatis quam antici setacei paullo brevioribus, corollæ tubo gracili recto faucibus haud amplificato calycem circa duplo excedente puberulo labio antico ovato-oblongo obtusissimo quam posticum obovatum breviter 4-lobum brevior, stigmate capitato apice emarginato.

Hab. Rabai, November.

Foliorum limbus 3.0–3.5 × 2.0–2.5 cm., membranaceus, in sicco viridis, subtus aliquanto griseus; petioli 1.0 cm. long., piloso-pubescentes. Inflorescentia circa 6.0 cm. long. Bracteæ 0.2 × 0.12–0.15 cm. Pedicelli 0.2 cm. long. Calyx totus 0.35 cm. long.; lobe posticus in sicco levissime discolor fere 0.2 cm. long. et lat.; lobi laterales 0.1 cm., antici 0.12 cm. long. Calyx fructificans (paullo post anthesin solummodo suppetitus) 0.5 cm. long., hujus lobe posticus 0.22 cm. lat. Corollæ tubus vix 0.7 cm. long., ima basi 0.1 cm. superne 0.15 cm. diam.; labium anticum 0.2 cm. posticum 0.3 cm. long. Antheræ 0.04 cm. diam. Stylus (ut stamina) e tubo corollæ brevissime exsertus, 0.7 cm. long.

Close to *O. Hildebrandtii* Baker, which on a first glance it greatly resembles, but that has a larger calyx with purple upper lobe and broader lateral and longer anticus lobes, a larger corolla broader in the tube, and with larger and differently shaped lips, and anthers double as large.

Var. *parvifolia*. Caulis cito glaber. Folia ovato-oblonga, acuta, crenato-serrata, modice 1.5–2.0 × 1.0–1.2 cm.

Hab. Kisauni, December.

Possibly distinct, though, except for the glabrous stems and smaller and differently shaped leaves, I can see no difference between it and the type.

II.—MR. JOHN GOSSWEILER'S ANGOLAN ACANTHACEÆ.

In 1904 the Museum acquired a large and important collection which Mr. John Gossweiler recently made in Angola. The *Acanthaceæ* of this collection have yielded the two novelties hereunder described, besides several plants of interest either geographically or for their rarity in herbaria. The following is the list:—

Hygrophila uliginosa S. Moore in Journ. Bot. 1880, 197.—Near Malange. No. 1079.

Brillantaisia patula J. And. in Journ. Linn. Soc. vii. 21, var. *Welwitschii* Burkill in Fl. Trop. Afr. v. 42.—Not uncommon in shady and wet spots in company with *Cyperaceæ* at Capoppa, Malange. No. 1048.

Phaylopsis lankesterioides Lindau in Engl. & Prantl, Pflanzenfam. Nachtr. zum ii.–iv. Th. 305 (*Phaulopsis*).—Quaballa, near Malange. No. 1081.

A suffruticose herb, usually procumbent. Tube of corolla dusky yellow, limb pure white, the lower lip marked with reddish violet dots.

Blepharis tetrasticha Lindau in Engl. Jahrb. xx. 29.—Between Malange and Quepacaca. No. 1069.

A many-stemmed unbranched undershrub about one foot high. Lip pale blue, pure white towards the throat. Plentiful, but flowers rare.

***Blepharis malangensis*, sp. nov.** Suffruticosa, ramis prostrato-ascendentibus nodulosis patule pubescentibus dein puberulis, foliis sessilibus in pseudoveriticillo maxime inæqualibus 2 elongatis lineari-lanceolatis 2 abbreviatis lanceolato-ovatis omnibus breviter spinoso-acuminatis margine hac atque illac spinulosis subcoriaceis scabridis, foliis floralibus lineari-lanceolatis breviter spinoso-acuminatis margine rarispinulosis quam caulina majora brevioribus inferne pilosohirtis ceterum glabris, floribus in cymis globosis rarius subglobosis ramulos breves laterales terminantibus dispositis, bracteolis lineari-oblongis linearibusve maximis e calycis lobis breviter superatis margine paucispinulosis apice spinuloso-acuminatis dorso pilosohirtis intimis integris margine ciliatis, calycis lobis inter se subæquilongis (lateralibus paullulum brevioribus) postico lanceolato apice rotundato-truncato et mucronulifero lobis anticis fere omnino connatis lanceolato-oblongis apice breviter ac debiliter bispinuloso-acuminatis infra apicem paucispinulosis lobis lateralibus anguste lineari-lanceolatis debiliter ac breviter spinuloso-acuminatis lobis omnibus margine ciliolatis, corollæ parvæ utrinque pubescentis lobis 3 brevibus subæquimagnis, antheris apice breviter barbatis.

Hab. Plentiful in tall grass and in thickets about Malange. No. 1082.

Folia caulina majora solemniter fere 10·0 cm. long., 0·5–0·7 cm. lat., 1-nervosa; minora 1·5 cm. × 0·7–1·0 cm., 3-nervosa, nervi subtus maxime eminentes, folia omnia basin versus pilosa. Cymæ 3·0–4·0 cm. diam., harum ramuli suffulcientes 1·0–2·0 cm. long.,

pubescentes. Folia floralia rigide patentia, 4.0–5.0 cm. long., 0.4–0.6 cm. lat., 1-nervosa, nervis lateralibus perspicuis centrali maxime prominente. Bracteolæ 1.5–1.8 cm. $\times$ 0.08–0.2 cm. Calycis lobi 1.5–1.7 cm. long., posticus vix 0.5 cm., anticus 0.5 cm., laterales 0.2 cm. lat., antici dentes 0.2 cm. long. Corollæ tubus 0.3 cm. long.; limbus violaceo-cæruleus, 1.1 cm. long., hujus lobus intermedius 0.2 $\times$ 0.2 cm., lobi laterales 0.25 $\times$ 0.2 cm. Filamenta 0.6 cm. long., basi calva; antheræ 0.4 cm. long. Ovarium anguste ovoideum, 0.2 cm., stylus glaber, superne leviter et gradatim attenuatus 0.7 cm. long. Capsula ovoidea, apice umbo-nata, 0.9 cm. long. Semina 0.4 cm. diam.

Near *B. panduriformis* Lindau, but certainly distinct by reason of the more globose inflorescences, longer and relatively narrower leaves and floral leaves, different bracteoles, narrower upper lobe of calyx not widening near the tip and ending in a short mucro instead of a long spiny point; lower lobes united considerably further up, smaller corolla with quite different lateral lobes and anthers without the long bearded appendage. From the recently described *B. carduacea* Lindau it differs in the pubescent branches, much narrower leaves, smaller spinulose bracteoles, posticus calyx-lobe not broader than anticous, much smaller corolla, &c.

Barleria villosa S. Moore in Journ. Bot. 1880, 267.—In rather humid situations near the brook at Malange. No. 1078.

Flowers pale violet, with longitudinal blue markings on the tube.

Asystasia Welwitschii S. Moore in Journ. Bot. 1880, 308.—Common on the road to Vulangombe, between Malange and the Quanze. Nos. 1068 and 1074.

Flowers whitish rosy, with purple marking.

Justicia (§ **BETONICA**) **Gossweileri**, sp. nov. Herba perennis sat humilis, caulibus e rhizomate valido pluribus ascendentibus ramosis, ramis obtuse quadrangularibus patule pubescentibus, foliis parvis breviter petiolatis ovato-oblongis utrobique obtusis scabriusculo-pubescentibus mox (costis setuliferis exemptis) fere glabris firme membranaceis, spicis oblongis plurifloris quam folia sæpissime longioribus, bracteis late ovatis acutis basi rotundatis minute scabriusculo-pubescentibus viridibus sursum purpureis, bracteolis quam bracteæ paullo brevioribus ovato-lanceolatis acutis pubescentibus, calycis minute puberuli lobis 5 lanceolatis breviter acuminatis a bracteolis duplo superatis, corollæ extus pubescentis tubo cylindrico calycem leviter excedente labis postico antico vix æquilongo subpanduriformi bidentato labri antici lobis lateralibus oblongis quam intermediis ovatus longioribus, filamentis glabris, ovario glabro.

Hab. Near Malange; common on spots annually cleared of all vegetation. No. 1071.

Planta summum 16.0 cm. alt. Folia 2.0–3.0 cm. $\times$ 1.0–1.2 cm.; petioli 0.2–0.5 cm. long., pubescentes. Bracteæ 1.0–1.3 cm. $\times$ 0.5–0.75 cm.; bracteolæ vix 1.0 cm. long., 0.32 cm. lat. Corollæ tubus 0.55 cm. long., 0.2 cm. lat., ima basi levissime coartatus; labium posticum 0.45 $\times$ 0.4 cm.; anticum 0.5 cm. long. hujus lobus intermedius 0.35 cm., lobi laterales 0.4 cm. long. Antherarum

loculus superior 0·13 cm., loculus inferior (calcare 0·07 cm. long. incluso) 0·25 cm. long. Pollinis grana 3-porosa. Ovarium anguste ovoideum, 0·08 cm., stylus 0·6 cm. long.

Near *J. nilgherrensis* C. B. Cl., which has similar small leaves, but the bracts are discoloured and differently shaped, being considerably narrower, more acute, and not so broadly rounded below. Moreover, the corolla is considerably larger and broader, the anthers larger and with a longer spur to the lower of the two, &c.

Monechma scabridum C. B. Clarke in Fl. Trop. Afr. v. 217.—Not abundant in neglected cultivated fields at Quomanhiango, near Malange. No. 1084.

Flowers yellowish white, with pale violet markings on lower side of tube.

Dicliptera micranthes Nees in Wall. Pl. As. Rar. iii. 112.—In neglected cultivated fields at Malange. No. 1080.

A species hitherto unrecorded for Lower Guinea.

Peristrophe Hensii C. B. Clarke in Fl. Trop. Afr. v. 243.—Near the Quanze. No. 1075.

Now first announced from Lower Guinea.

P. usta C. B. Clarke in Fl. Trop. Afr. v. 244.—Quite common in thickets near the Governor's palace at Malange. No. 1072.

A Nyassaland and Rhodesian plant, till now unknown from Lower Guinea.

NOTES ON CORNISH PLANTS.

BY G. CLARIDGE DRUCE, M.A., F.L.S.

In July, 1904, I spent a short time in working the beautiful coast of the Lizard, Kynance and Mullion; I then visited Looe Pool, in order to gather *Chara hyalina*, and then explored the district round Truro. Later on I went to Bodmin, in order to gather *Physospermum*. It was unlikely that any well-marked plant would be discovered in such a popular botanical hunting-ground as the one I went over, but several very interesting plants were found, in addition to the well-known rarities of the Cornish coast. The wind-swept Lizard Downs offer many curious forms, some of which, such as the prostrate forms of *Cytisus scoparius*, have received varietal rank. The dwarf monocephalous form of *Chrysanthemum Leucanthemum* should be tested under more normal conditions, to see whether its condition is simply due to the exposed situation. The dwarf form of *Stachys Betonica* still keeps a much smaller plant than the ordinary form in the Cambridge Botanic Garden. *Jasione montana* occurs as a dwarf rigid form quite distinct from the var. *littoralis*. The dwarf form of *Serratula* is given varietal rank in the London Catalogue. *Carex Pairæi* F. Schultz, which is closely allied to *C. muricata*, has not, to my memory, been previously reported as British.

In the following list additions to the county flora are indicated by asterisks.

Glaucium flavum Crantz. On Looe Bar and at Pär.

Fumaria Borai Jord. Several places about the Lizard.

Viola lactea Sm. Downs above Kynance.

Silene maritima With. *var. *parvifolia*. A large diffuse prostrate plant, with the leaves very small ($\frac{1}{4}$ – $\frac{1}{3}$ in.), but with the solitary or subsolitary flowers of the normal size. Growing on the shingle at Looe Bar.

Sagina procumbens L. A fleshy form, at the Lizard.—*S. ciliata* Fries. The Lizard.—*S. apetala* Ard. Truro.—*S. maritima* Don. The Lizard.

Buda rupestris Druce. Polperro.

Geranium striatum L. Penwether, Tredudwell.—*G. phæum* L. Naturalized at Tredudwell.

Rhamnus Frangula L. Plentiful in Margot Wood, near Bodmin.

Ilex Aquifolium L. forma *mitis*. Penrose.

Trifolium pratense L. The flowers on the Lizard were distinctly paler in colour than those of our inland plant.—*T. repens* L. var. *Townsendii*. In cultivation at Messrs. Sutton's Trial Grounds at Reading, the flowers in some cases revert to the normal colouring, while others on the same plant retain the dark purple tint.

Rubus Lindleianus Lees. Truro; Penrose.—*R. leucostachys* Schleich. The Lizard; Truro; Bodmin.—*R. fissus* Lindl. Bodmin. New to the county.—*R. cariensis* Rip. & Génév. Bodmin, but with some slight doubts as to identity. New county record.—*R. micans* Gren. & Godr. Truro. New county record.—*R. opacus* Focke. Bodmin. New county record.—*R. oigocladus* Muell. & Léf. Fowey.—*R. Powellii* Rogers. Truro. A very interesting addition to the county flora, and a great extension of its range in Britain, the plant being previously known only from Essex, Kent, and Oxfordshire.—*R. scaber* W. & N. Bodmin. A strong form, only on doubtful record previously.—*R. erythrinus* Génév. Bodmin.—*R. dumnoniensis* Bab. Common about the Lizard.—*R. pulcherrimus* Neum. Truro, Penrose, &c.—*R. dumetorum* W. & N. *var. *ferox* Weihe. Fowey.

Cratægus oxyacanthoides Thuill. This is stated in Davy's list to be general throughout the county. I saw no example of it either at the Lizard, Polperro, Helston, Truro, or Bodmin. Less divided leaved forms of *C. Oxyacantha* are not unfrequent, and doubtless these have been mistaken for it.

Myriophyllum alterniflorum DC. Looe Pool.

Callitriche stagnalis Scop. In the runnels in the streets at Helston; on the Lizard Downs, &c.—*C. obtusangula* Le Gall. Gunwalloe.

Epilobium montanum × *obscurum*. Liskeard.—*E. lanceolatum* × *obscurum*. Liskeard.—*E. palustre* L. Looe Pool.

Apium nodiflorum Reichb. fl. var. *ocreatum* Bab. Lizard.

Galium verum L. var. *littorale* Brebisson. Kynance Cove.—*G. palustre* L. var. *Witheringii* (Sm.). Near Truro.—*G. uliginosum* L. Near Truro.

Sherardia arvensis L. *var. *Walravenii*. Near Helston, and near Church Cove, Lizard.

Valerianella dentata Poll. var. *mixta* Dufr. Church Cove, Lizard.

Matricaria inodora L. and *M. maritima* L. Porthleven.

**Santolina Chamæcyparissus* L. Church wall of Lanteglass. Quite naturalized.

Senecio aquaticus Huds. var. *pennatifidus* Gren. & Godr. Kynance.

Arctium minus Bernh. The Lizard. — *A. intermedium* Lange. Gunwalloe.

Carduus tenuiflorus Curt. The Lizard. — *C. lanceolatus* L. *var. *nemorale* (Reichb.). The Lizard. Doubtless this is the *C. eriophorus* Richards (not Linn.) of the Tentative List.

Crepis virens L. var. *agrestis* (W. & K.). The Lizard.

Hieracium umbellatum L. var. *monticola* (Jord.). Truro.

Leontodon hirtum L. With very pale yellow flowers at the Lizard.

Sonchus oleraceus L. var. *lacerus* Willd. The Lizard. — *S. asper* Thuill. var. *pungens* Bisch. Mullion.

Jasione montana L. Dwarfed to about two inches on the Lizard Downs, but not the var. *littoralis* Fries. The stems were quite simple. *Forma alba* at Porthleven.

Statice linearifolia Later. The only form observed at the Lizard, but the leaves vary much in size and in breadth.

**Cyclamen hederæfolium* Ait. In grass-land near Senya between Falmouth and Penzance (*C. F. Vincent*, 1902).

Anagallis arvensis L. var. *carnea*. The Lizard.

Symphytum asperrimum Bab. Roadside between Helston and the Lizard.

Myosotis repens Don. Glyn Woods; Penwether.

Volulus Soldanella L. Looe Bar.

Convolvulus arvensis L. Rather plentiful at the Lizard in several places.

Antirrhinum majus L. Naturalized at Liskeard.

Euphrasia curta Fries. The Lizard.

**Rhinanthus stenophyllus* Schur. Penrose, near Helston.

Melampyrum pratense L. Margot Wood.

Melittis Melissophyllum L. Margot Wood.

Stachys Betonica Benth. Dwarfed to two or three inches and with deep crimson flowers on the Lizard Downs; also a white-flowered form. The latter cultivated in Hort. Cantab. only slightly increases in size.

Lamium hybridum Vill. Penrose.

Plantago major L. var. *intermedia* (Gilib.). The Lizard.—*P. Coronopus* L. var. *tenuisecta*; var. *tenuifolia-hirsuta*; leaf-cutting of var. *maritima*, but hairy. All occurred about the Lizard.

Atriplex Babingtonii Woods. Gunwalloe.—*A. laciniata* L. Gunwalloe.

Polygonum maritimum L. Gunwalloe. Beautiful specimens of this rare species.—*P. Persicaria* L. var. *incanum* Gren. & Godr. Bodmin.

Myrica Gale L. Marsh near Glyn Woods.

Salix repens L. Rather plentiful on the Kynance Downs.

Populus tremula L. and *P. nigra* L. Near Helston. The latter planted, doubtless.

Orchis maculata L. var. *ericetorum* (Linton). Lizard Downs.

Habenaria chloroleuca Ridley. Margot Wood.

Allium Ampeloprasum L. var. *genuinum* Syme. On a garden-fence at Tredudwell. Evidently a garden outcast.

Juncus bufonius L. var. *fasciculatus* Koch. The Lizard.—*J. bulbosus* L. var. *uliginosus* (Sibth.). Penwether.

Juncoides multiflorum Druce. Bodmin, in Glyn Woods.

Typha latifolia L. Par.

Potamogeton pusillus L. Looe Pool.

Scirpus setaceus L. Marsh near Glyn Woods.

Carex rulpina L. Near Gunwalloe.—**C. Pairæi* F. Schultz in *Flora*, 1868, p. 302. Between Helston and Porthleven.—*C. Goode-nowii* Gay var. *recta*. Kynance Downs.—**C. flacca* Schreb. var. *Micheliana* (Sm.) teste Kukenthal. The Lizard.—*C. Ederi* Retz var. *ædocarpa* Anderss. Kynance Cove.—*C. neglecta* Lois (*C. distans* L. pro parte). Near Kynance Cove.

Agrostis alba L. var. *coarctata* (Hoffm.). Lizard.—Var. *maritima* Mey. Par.

Aira caryophyllea L. A densely tufted prostrate form occurred in recently cleared turf above Kynance Cove.

Holcus lanatus L. *var. *albo-virens* Reichb. Ic. Fl. t. 1720. By the Lizard Lighthouse.

Arrhenatherum tuberosum Gilib. Lizard.

Koeleria cristata Pers. var. *gracilis* (Pers.). Kynance.

Melica uniflora Retz. Glyn Woods.

Dactylis glomerata L. var. *abbreviata* Bernh. Lizard.

Poa nemoralis L. Penrose. — *P. pratensis* L. var. *subcærulea* (Sm.). Lizard. — *Festuca rubra* L. Common. — Var. *pruinosa* Hack. Lizard; Mullion.

Agropyron canium Beauv. Penrose.—*A. junceum* × *repens*. Gunwalloe, Looe Bar, &c. — *A. junceum* Beauv. Gunwalloe; near Porthleven.

I have to thank the Rev. W. Moyle Rogers, Pfarrer Kukenthal, Mr. H. W. Pugsley, Mr. E. G. Baker, and Prof. Hackel for examining the Rubi, the Carices, the Fumariæ, the forms of *Plantago*, and the Graminæ respectively

MENTHA CITRATA EHRLH.

(*M. odorata* Sole, *M. hirsuta* Huds. c. *citrata*, Lond. Cat. ed. ix.)

BY JAMES W. WHITE, F.L.S.

IN September last I found this plant growing for fifty yards or so along a wet grassy roadside at an elevation of 850 ft. on Mendip, not far from Priddy Nine Barrows, North Somerset. The only record for it in the county hitherto appears to be that in *New Bot. Guide Suppl.*, from between Bridgwater and Street (v.-c. 5), by Rev. J. C. Collins, many years ago. The Mendip gathering has purplish-green foliage—the whole plant being much darker in tint

than the *M. aquatica* that grows close to it—and is practically glabrous throughout with the exception of the calyx-teeth, which are ciliate. Its inflorescence forms a short oblong or oval spike. The sweet scent of the leaves is a striking feature—not greatly mint-like, but recalling the odour of citron or bergamot.

As my specimens had not the absolutely glabrous character nor the round head of flowers claimed for this plant in the British Floras of Hooker, Syme, and Babington (the only detailed description among these is by Syme), I went closely into the matter as far as the books at my disposal would admit. *M. citrata* seems to be a doubtful native in most of its localities, whether in Britain or on the Continent. Although stated to be wild in a few instances, and subsontaneous here and there, garden examples—often from Kew—are the most frequent in herbaria. Its great rarity in the wild state is evidenced by Sir J. E. Smith's statement that he had not met with it in any old herbarium, and by the paucity of records in county lists. It is treated as a variety of *M. aquatica* L. by many botanists, British and foreign, and as a distinct species by Baker, Syme, Boreau, and Grenier & Godron. The figure in *English Botany*, drawn in 1802 from a wild specimen obtained near Bedford, shows a subglobular terminal head instead of the "épi court" of Boreau, and the "épi ovale ou oblong" italicized by Grenier. Dr. Boswell Syme adopted the views of Mr. Baker on mints, and in his description—possibly made from the Bedford plant, for it does not appear that he ever saw this species in the wild state—says that the calyx-teeth are glabrous. He refers, however, to Koch, *Syn. Fl. Germ. et Helv.*, where one reads (ed. iii.), "glabra calycibus tantum ciliatis." The new German edition of Koch's *Synopsis*—in which critical genera are dealt with most unequally by various writers—contains no mention whatever of the plant under consideration.

Turning to Mr. J. G. Baker's paper on English Mints in *Journ. Bot.* 1865, p. 233, one finds, curiously enough, that he likewise had no knowledge of *M. citrata* in a wild state, save from the Bedford specimens, one of which furnished the figure in *English Botany*. As the *Students' Flora* and the *Manual* both followed Baker on this genus, it seems clear that all the British accounts of *M. citrata* hark back to one gathering—that made by Dr. Abbott near Bedford in 1802, which was a round-headed mint with glabrous calyx-teeth. Sole figured his *M. odorata* from a plant discovered by himself in North Wales. This has also a depressed-globular inflorescence, but is not described as being entirely glabrous, "foliis glabrioribus . . . caule rubro glabriore." The capitate mint from Sussex, of which Dillenius gives a figure in *Raii Syn.* 233, tab. 10, f. 1, and of which he wrote "odor valde gratus et aromaticus mala aurantia plane æmulans," although portrayed as very pubescent, is accepted by Sole as *odorata*, with this comment, "it is well known that the difference of soil constitutes this difference." Further, Willkomm & Lange (*Prodr. Fl. Hisp.*) write "caule foliisque fere omnino glabris," and Gillet & Magne (*Nouvelle Flore Française*, 1898) follow with "bractées, calices et pédicelles glabres ou à peine velus." We may conclude, therefore, that the bergamot mint is as

variable as many other members of this changeable genus. Like some kindred species, it evidently includes both spicate and capitate forms, individuals differing a good deal both at home and abroad in elongation of the spike, and also in shape of the leaves; while as regards degrees of pubescence they may vary from an absolutely glabrous condition, through others with bristly or ciliate calyx-teeth, to plants much nearer the ordinary state of *M. aquatica*. Some of these intermediates have been named by Wirtgen and others.

I have been much interested by finding in Mr. D. Fry's herbarium a specimen of *M. citrata* entirely glabrous, and exactly corresponding in inflorescence with the *English Botany* figure and description. This was gathered by Mr. Fry on the bank of a little brook at St. Florence, Pembrokeshire, in 1885. Mr. Fry suggests that as the place was formerly a Flemish colony, the plant may have been introduced in Pembrokeshire by Flemings. He points out also that the bergamot mint is hardly to be found in gardens nowadays, and is not offered for sale by nurserymen in their herb-lists.

The sweet scent of the foliage must be very lasting, for it is still recognizable in Mr. Fry's specimen after twenty years. I notice, however, that the odour of my Mendip plant, though strong enough in its prime, had sensibly diminished a month later when the leaves were falling from the withering stems. I know not how to account for the fact that, not only in *M. aquatica*, but in several other *Menthae*, the more or less glabrous variations are accompanied by corresponding changes in essential odour, the latter becoming more refined and pleasant in proportion to the absence of pubescence on the plant.

On the point whether *M. citrata* should be specifically separated, or should stand as a variety of *M. hirsuta* Huds., one feels with Watson that this is "one of those cases in which all botanists have equal right to make either more or fewer species and varieties out of the same material, and are just as likely to be correct by doing so." Yet, in the extreme state as exemplified at Bedford and in Pembrokeshire, the plant has nothing whatever in common with *M. aquatica*, save that they are both capitate mints.

SHORT NOTES.

NEW VARIETY OF *POLYGALA SERPYLLACEA*.—A well-marked variety of this (in Cornwall) somewhat variable species was found by me towards the close of the month of September. Fresh specimens were sent to Mr. Arthur Bennett, and as it was a form quite new to him, Mr. Bennett transmitted one of them to Dr. Chodat, of Geneva, the monographer of the genus. Dr. Chodat's reply stated that the plant was the most striking form he had ever seen, quite deserving varietal, if not even subspecific rank. He names it

P. serpyllacea Weihe var. *vincoides* Chodat, *in litt.*, and the description which he has drawn up is as follows:—"Foliis ellipticis, breviter acutis subimbricatis plerumque oppositis superioribus tantum alternis, racemis terminalibus brevibus haud involucratis, alis magis ellipticis quam oblongis, crista minus divisa circa 8 loba, lobis marginalibus latioribus incisis, stylo ovario haud longiore, seminibus ellipsoideis lævibus potius patentibus parce hirsutis." Leaves elliptical, shortly pointed, subimbricate, mostly opposite, only the upper ones alternate, racemes terminal, short, not at all involucred, wings more elliptical than oblong, crest but little divided, about 8-lobed, the marginal lobes wider and incised, style not at all longer than the ovary, seeds ellipsoidal, smooth, rather patent, sparingly hairy." The plant was first found sparingly on an exposed down near the eastern border of the parish of Gwennap, about midway between Redruth and Truro (v.-c. 1). A week or two later I found it more plentifully at the western end of the parish, on the top of a hill, about 700 ft. above the sea. In both places it was associated with *Potentilla silvestris* var. *sciaphila*, and *Ulex Gallii* var. *humilis*, two interesting plants new to Cornwall. In the first locality only blue-flowered examples of the *Polygala* were seen; in the second, blue and pink-flowered ones were growing together. As the season was far advanced when this addition to our flora was discovered, I am unable to say if late flowering is one of its features; but from what I saw in the two places where it occurs, I think this very probable.—F. HAMILTON DAVEY.

NONNEA PICTA Sweet.—About half a dozen plants of this native of the East were found this summer at Ivy Hatch, near Sevenoaks, by Miss Edith Head. They were growing in a grassy field close to broken ground where in former years gravel had been taken away, and it is difficult to understand how the plant could have got there, since it is more than five minutes' walk from any house, and it is not, so far as I am aware, grown in this country as a garden plant. E. M. HOLMES.

ROBERT LYALL: A CORRECTION. — It may be well to note a curiously misleading statement in the *Dictionary of National Biography's* notice of Robert Lyall, originating in a misinterpretation of the paragraph relating to him in the "Biographical Index" (*Journ. Bot.* 1889, 34). The notice states that "a list [of his Madagascar collections] was published by Lasèque [*sic*]" and later, "Lasèque's plants at Kew." The notice in the *Journal* runs: "Plants at Kew, Lasèque, 557," the latter reference being, of course, to Lasèque's *Musée Botanique*, which contains no lists. It may perhaps be well to call attention to the fact that the *Biographical Index* in its volume form contains much matter not to be found in its original publication in this *Journal*.—JAMES BRITTEN.

NOTICES OF BOOKS.

The Algæ-vegetation of the Færoese Coasts, with remarks on the Phyto-geography. By F. BÖRGESSEN. Copenhagen: Thiel. 1905. Pp. 681-834. Reprinted from the *Botany of the Færoes*, Part II. 12 plates, figs. in text.

The Distribution of the Marine Algæ of the Arctic Sea and of the Northernmost part of the Atlantic. By F. BÖRGESSEN and HELGI JÓNSSON. xxviii pp. Appendix to the *Botany of the Færoes*.

DR. BÖRGESSEN'S exhaustive paper on the marine algæ of the Færoes is the result of six visits paid by him to those islands between 1895 and 1902. For part of the time he had the privilege of being quartered on board vessels of the Danish navy, stationed at the islands, and was accorded opportunities of visiting remote parts of the coast, and of obtaining a thorough knowledge of the marine vegetation of the Færoe Islands. This knowledge he now embodies in this eminently readable and valuable contribution to the *Botany of the Færoes*. Dr. Børgesen deals with his subject under five main divisions: 1. On the external conditions affecting the algal vegetation on the Færoese coasts; 2. Algæ-regions and algæ-formations on the coasts of the Færoes; 3. General character of the algæ-vegetation; 4. The phyto-geographical position of the algæ-flora of the Færoes; 5. Some biological observations.

Under the first heading the author treats of climatic and hydrographic conditions: namely, temperature and salinity of the sea; tides and oceanic currents; action of the waves on exposed coasts and sheltered coasts; temperature and humidity of the air; light. He also describes the nature of the coast. The climate of the Færoes is characterised by fogs, rain, and cloudy weather; hot sunshine is rare, and this fact influences the character of the marine vegetation and still more its distribution in depth, as is shown by the fact that many *Florideæ* are found thriving on the beach, even above the highest water mark. The littoral vegetation is therefore much more developed in the Færoes than in Norway for instance, where the sunshine is more common, although the actual composition of the two vegetations is much the same. The conditions of life are favourable to algæ along the shores of the Færoes, for rocks are plentiful and both large and small pools abound.

The title of the second division of the paper, devoted to the algæ-regions and algæ-formations, may sound somewhat obscure. The regions are the "Gebiete" of Kjellman, the Littoral, Sublittoral, and Elittoral; the Littoral extending from the highest tide-mark to the lowest ebb; the Sublittoral from the lowest ebb to a depth of twenty fathoms, and the Elittoral anything below twenty fathoms. The "Algen-formation" of Kjellman is termed by Dr. Børgesen Algæ-association, and indicates a patch of vegetation which is distinguished by some special character, being as a rule composed of one or, at the most, but few species. These associations are often united in a natural way into larger communities,

where they live together under the same or very similar biological and ecological conditions, and Dr. Børgesen proposes for these large groups the name of Formations. The Formations and Associations which occur in the littoral and sublittoral regions are dealt with in detail; and photographs are given of some of them, among which that of the *Himanthalia*-association is particularly successful. Under the heading of the general character of the algæ-vegetation, there is an instructive diagram giving a general view of the different algæ-formations and associations, the different levels at which they occur, and the manner in which they replace each other. From this diagram we see that the number of Algæ-associations reaches its maximum in the littoral region and then gradually decreases on each side.

A vastly interesting side of the subject is treated in the fourth part of the paper, namely, the origin of the Færoese marine flora and its relation to that of the other countries. The author discusses the influence of the Glacial Period, and concludes by saying that the marine algæ of the islands have been able to immigrate after the Glacial Period across the sea from the nearest countries, principally from the British Islands, but also from Norway and Iceland. The present flora is to be regarded as a scanty selection of that of Northern Scotland, with the addition of some few more northern species not found in the British Isles.

Finally, the author deals with the duration of life and the period and conditions of growth and time of fructification. An index to literature includes eighty-eight references. The illustrations are particularly good. They are all reproduced from photographs of various typical algæ-associations—*Porphyra*, *Gigartina*, *Corallina*, and the like.

Besides this valuable contribution of Dr. Børgesen to the botany of the Færoes, there is also an appendix by himself and Helgi Jónsson, which deals with the distribution of the marine algæ of the Arctic Sea and of the northernmost part of the Atlantic. The object of this paper is to compare the Færoese and the Icelandic marine algæ-flora with that of the neighbouring coast. Besides the algæ of the Arctic Sea, all species are included from along the North Atlantic coast of Europe to the north of a line drawn from Lindesnaes, in Norway, to the boundary between England and Scotland; as well as the species from the coast of New England. The area is divided into seventeen districts, and a comparison of the respective marine floras is presented in the form of tables. Subsequently lists are given of the species which form certain groups termed by the authors Arctic, Subarctic, Boreal-arctic, Cold Boreal, and Warm Boreal. The distribution of the *Chlorophyceæ* and *Cyanophyceæ*, being less well known than that of the *Florideæ* and *Phæophyceæ*, is treated on more limited lines, both as to area of distribution and number of species cited, and is given separately in a supplement. A bibliography of fifty-four works completes this valuable Appendix.

E. S. GEPP.

Bibliographical Index of North American Fungi. By W. G. FARLOW, Professor of Cryptogamic Botany in Harvard University. Vol. i. part 1, *Abrothallus* to *Badhamia*. 8vo. Pp. i-xxxv, and 1-312. Carnegie Institution of Washington. 1905.

THIS most important publication owes its origin to the fact that when Professor Farlow returned from Europe in 1874, after two years spent in the study of mycology, he found it impossible to ascertain what species of fungi were known to occur in the United States, all the accounts of North American species since 1834 being scattered in papers of learned societies or other publications, often difficult of access. He determined therefore to form a card catalogue of all references to North American species for the purpose of easy reference. In conjunction with Professor Trelease an author's catalogue, including the titles, of all works on the subject was started, and these lists have been continued up to the present date. The compiler's object in publishing it is to save duplication of labour and expense in universities where the study of descriptive botany is pursued, as well as in experiment and other government stations devoted to vegetable pathology.

The scope of the work is to include all species occurring in North America, the West Indies, and Central America, exclusive of Bacteria and Saccharomycetes. In the case of a few common species such as *Agaricus campestris*, only those references are given which are important as showing their range or furnishing good illustrations. The whole index is arranged alphabetically. The names employed in Saccardo's *Sylloge Fungorum* and Engler & Prantl's *Pflanzenfamilien* have been followed as far as possible, these works being those in general use; except where it has been necessary to follow more recent critical monographs. The principle of adopting the oldest specific name has been followed, except in cases where there is some doubt as to what the species described under the oldest name really was, owing to vagueness of description and crudeness of illustration. Professor Farlow wisely makes as few changes as possible; he pertinently remarks in the preface that it is best not to make too violent attempts to interpret the older mycologists, but to be content to let the dead bury their dead. He suggests that at the next International Botanical Congress a list of named genera of cryptogams which have been clearly defined and generally recognized for many years, should be presented for consideration as exempt from future changes on the ground of priority.

The author acknowledges freely the assistance that he has received in the great labour entailed in producing this index. The arrangement and type are excellent, and the critical notes which are found on nearly every page will be invaluable to students and workers on fungal plant-diseases. The plan adopted under *Æcidium* and *Agaricus* of giving cross references will save much time and trouble to those who are engaged in preparing local lists and have to refer to older lists containing old names. Professor Farlow may be heartily congratulated on having begun a list which must win for him the gratitude of all students of mycology in North America,

and of setting an example of useful work that it may be hoped will speedily be followed in this country. In so far as concerns the species common to this country and North America it will be exceedingly useful to mycologists in Great Britain.

E. M. HOLMES.

BOOK-NOTES, NEWS, &c.

At the meeting of the Linnean Society on the 7th of December, Mr. James Saunders showed a series of lantern-slides illustrating the habits of Mycetozoa. His observations were practically confined to the species seen within a radius of ten miles from Luton. Out of two hundred and seven species catalogued by Mr. A. Lister from the whole world, no fewer than ninety-six, or forty-six per cent., have been found in the district specified. The species shown were *Badhamia utricularis*, *Trichia varia*, *Chondroderma radiatum*, and *Physarum leucopus*, with remarks on their irregular and uncertain appearance, and the distribution in certain parts of the world. The President commented on the exhibition, and mentioned that a small dried-up plasmodium had long served him for demonstration to his junior classes on the phenomenon of restoration to activity by moisture and warmth.

THE formation of a bryological section of the Belgian Société Royale de Botanique has been the signal for an outburst of activity among the students of mosses and hepatics in Belgium. One of the most active of these bryologists, Monsieur A. Mansion, realizing the great need there is for a *Flore des Hépatiques de Belgique*, has collected the requisite facts and material, and has published a first instalment in the Bull. Soc. Roy. Bot. Belgique, xlii. ii. pp. 44-112 (1905). It is reissued as a separate fascicle of seventy-one pages (Gand: Hoste, 1905). The author here treats of the *Anthocerotineæ*, *Marchantineæ*, and the anacrogynous section of the *Jungermannineæ*, namely, from *Sphærocarpus* to *Hoplomitrium*. He has followed the classification of Schiffner in Engler & Prantl's *Natürlichen Pflanzenfamilien* in its main lines. His descriptions are careful, and his notes valuable. A key to the species is given under each genus. The distribution quoted for the species is full. The author appears to have taken great pains in the preparation of his work, and the latter when completed will be of great service to his fellow-countrymen and others.—A. G.

WE are glad to see that the Council of the Royal Institution of Cornwall have recognized the work of Mr. F. H. Davey on the flora of this county by presenting him with the Henwood Gold Medal—a triennial award which is now for the first time conferred upon a botanist.

THE Moss Exchange Club have issued a *Census Catalogue of British Hepatics* compiled by Mr. Symers M. Macvicar. It is the

first attempt that has yet been made to map out in their vice-counties the hepatics of the British Isles. The vice-counties of Great Britain are 112 as defined by H. C. Watson in 1852; and for Ireland the 40 vice-counties planned by Mr. Lloyd Praeger in 1896 are adopted. The system of classification is that elaborated by Schiffner in Engler & Prantl's *Die natürlichen Pflanzenfamilien*, and comprises seventy genera and two hundred and forty-nine species; varieties also are recognized, and, where necessary, synonyms are inserted. Several bryologists have contributed help in the form of lists from their special districts for incorporation; yet, as would naturally be expected in a catalogue of this character when first issued, large gaps in the distribution of the species are noticeable. For instance, the majority of the counties of the south coast, the Thames valley, and the South Midlands are unrepresented in the catalogue by any species at all, yet the records requisite for filling many of these gaps have been published. To give a few examples: in Trimen and Dyer's *Flora of Middlesex* twenty-three species are quoted, in Druce's *Flora of Oxfordshire* twenty-six, in Pryor's *Flora of Hertfordshire* forty-one, in the *Essex Naturalist* iv. (1890) p. 221, four species, and *op. cit.* v. (1891) p. 9, twenty-two species. Copies of the catalogue may be had from Mr. William Ingham, 52, Haxby Road, York, at 9d each. The Moss Exchange Club is to be congratulated upon the production of this useful preliminary working list; it remains for local bryologists to contribute towards the completion of its efficiency.—A. G.

A CORRESPONDENT calls our attention to the following advertisement, which appeared in a recent issue of the *Gardeners' Chronicle*. We feel that we ought not to withhold from our readers the information it contains as to the special—we may say, peculiar—properties attributed to *Gentiana verna*:—

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No. 518

FEBRUARY, 1906

Vol. XLIV

THE
JOURNAL OF BOTANY
BRITISH AND FOREIGN

EDITED BY

JAMES BRITTEN, K.S.G., F.L.S.

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LONDON

WEST, NEWMAN & CO., 54, HATTON GARDEN, E.C.

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Price One Shilling and Eightpence

THE JOURNAL OF BOTANY

BRITISH AND FOREIGN

EDITED BY

JAMES BRITTEN, K.S.G., F.L.S.

THE JOURNAL OF BOTANY was established in 1863 by Dr. Seemann. In 1872 the editorship was assumed by Dr. Henry Trimen, who, assisted during part of the time by Mr. J. G. Baker and Mr. Spencer Moore, carried it on until the end of 1879, when he left England for Ceylon. Since then it has been in the hands of the present Editor.

Without professing to occupy the vast field of general Botany, the Journal has from its inception filled a position which, even now, is covered by no other periodical. It affords a ready and prompt medium for the publication of new discoveries, and appears regularly and punctually on the 1st of each month. While more especially concerned with systematic botany, observations of every kind are welcomed. Especial prominence has from the first been given to British botany, and it may safely be said that nothing of primary importance bearing upon this subject has remained unnoticed.

Bibliographical matters have also received and continue to receive considerable attention, and the history of many obscure publications has been elucidated. Every number contains reviews of new and important books written by competent critics: in this as in every other respect a strictly independent attitude has been maintained. While in no way officially connected with the Department of Botany of the British Museum, the Journal has from the first been controlled by those whose acquaintance with the National Herbarium has enabled them to utilize its pages for recording facts of interest and importance regarding the priceless botanical collections which the Museum contains. In 1896 it became necessary to increase the size of the Journal, owing to the number of papers sent for publication: the number of plates was at the same time augmented.

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The Editor, 41 Boston Road, Brentford.

The volumes for 1884 to 1895, bound in cloth, can still be had, price 14s. each, or £7 10s. the set. From 1896 to 1905, bound in cloth, can be had at £1 1s. each.

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A.B. Rendle anal.
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West, Newman imp

A, 1-4, *Allium Hugonianum* Rendle. B, 5-7, *A. plurifoliatum* Rendle
C, 8-11, *A. tubiflorum* Rendle.

NEW MONOCOTYLEDONS FROM CHINA AND TIBET.

By A. B. RENDLE, M.A., D.Sc.

(PLATE 476.)

THE following notes and descriptions of new species have been made in the course of working out some *Liliaceæ* and *Juncaceæ* from the Calcutta Herbarium, especially those collected on Major Younghusband's recent frontier commission, a full account of the botany of which is being prepared by Dr. Prain. The evident close relation between some of the plants of Tibet and South-west China, as exemplified, for instance, in *Allium macranthum*, led to the comparison of the Chinese collections, and the description of several novelties contained in the collections made by Father Hugh (Scallan) in North Central China.

Aletris gracilis, sp. nov. Herba semipedalis vel minor, glabra, habitu *A. nepalensis* sed gracilior, foliis angustis suberectis vel leviter recurvatis, caule brevioribus, ad $3\frac{1}{2}$ poll. longis, 2 lin. latis, siccis complicatis, superne acutatis; caule infra terete, vix $\frac{1}{2}$ lin. lato, superne complanato; racemo pollicare vel minore, leviter 5-9-floro; bracteis angustis flores subæquantibus vel longioribus; floribus breviter pedicellatis, erectis; perianthio glabro, circa $1\frac{1}{2}$ lin. longo, fere ad basin 6-partito, lobis lineari-oblongis, demum patentibus; filamentis e basi loborum liberis, antheris cordatis; ovario ovoideo, ad medium usque adnato, cum stylo semilineo rostrato.

Hab. Tibet; Latong, 6000 ft., *Younghusband*, June 29th, 1903.

Near *A. nepalensis*, Hook. f., but distinguished by its quite glabrous stem, more deeply divided perianth, and longer filaments.

ALLIUM (SCHÆNOPRASUM) CONDENSATUM Turcz. A large-flowered form of this North-Asiatic species. The densely crowded campanulate flowers are borne on pedicels barely equal in length to the perianth, which is 6 mm. long.

North Central China; Shensi; Mt. Lao-y-san, *Hugh*, September, 1899.

This species was also collected in Hupeh by Dr. A. Henry (no. 6926).

Allium (RHIZIRIDIUM) tibeticum, sp. nov. Planta glabra cæspitosa semipedalis, bulbo tenuiter cylindrico, in rhizomate, ut apparet ascendente, insidente, tunicis membranceis, pallide brunneis, demum in fibras parallelas solutis; foliis 2-3, scapi basin vaginantibus, umbellam sæpius vix attingentibus; lamina lineare, superne paullo angustata, marginibus scabridulis involutis, scapo subterete; umbella densiter pauciflora, spatha ea brevior, univalve, late scaphoidea et breviter rostrata; pedicellis florum dimidio rariter longioribus; perigonio subgloboso-campanulato, cyaneo, segmentis obtusis, interioribus late ovato-oblongis, exterioribus paullo brevioribus, ovatis, concavis; staminibus perigonio circa $\frac{1}{3}$ brevioribus, exterioribus cum basi anguste triangulare, interioribus cum basi late auriculata, interdum utrinque breviter dentata; antheris ellipsoideis; ovario subgloboso; stylo incluso; ovulis in loculis geminis.

Plants 10–16 cm. high. Leaf-blade, when flattened, 3 mm. broad. Umbel 1–2 cm. in diameter. Flowers “deep blue,” 5 cm. long, pedicel rarely more than half the length; anthers about 1 mm. long; style scarcely 3 mm. long.

Tibet; Karo La Pass, about 16,500 ft., *Walton*, July, 1904; near Maku La, *Younghusband*, July–August, 1903, no. 178; Karo La, fifteen miles from Lhasa, *Dunghoo*, Aug. 13th, 1878.

Near *A. sikkimense* Baker, but distinguished by the smaller, less campanulate flowers, with the alternate stamens broad-shouldered and often toothed.

Allium (RHIZIRIDIUM) **phariense**, sp. nov. Planta glabra 5-pollicaris, bulbo solitario, rhizomate crasso perpendiculare insidente, anguste ovoideo, superne in basin caulis arcte vaginatam transgrediente, tunicis scariosis, integris, rubrotinctis; scapo infra medium foliato, foliis 2–4, planis, anguste linearibus, obtusis, scapo paullo longioribus, superne autem recurvatis; scapo leve, terete, superne compresso; umbella sphaerica, densiter multiflora; spatha univalve, vix rostrata, quam umbella brevior; pedicellis vix florum dimidium aequantibus; perigonio aperte campanulato, albo, sicco paleaceo, segmentis aequalibus subanguste obovatis, obtusis; staminibus simplicibus liberis, angustissime subulatis, prope basin petalorum insertis; ovario subgloboso; stylo tenue; loculis bi-ovulatis.

Plant about 12 cm. high; bulb about 2 cm. long by 1 cm. broad. Leaf-blade to 8 cm. long by 2 mm. broad. Umbel 2 cm. diam.; spathe 1 cm. long. Flowers 5 cm. long; filaments of stamens 8 mm. long. Ovary barely 2 mm. long; style nearly 6 mm. long.

Hab. Tibet; Po-tong-lo, two miles north of Phari, *Dunghoo*, Aug. 16th, 1878.

A well-marked species, perhaps most nearly allied to the Western Himalayan *A. blandum* Wall., but a much smaller plant, and distinguished also by its very shortly pedicelled white flowers.

Allium (RHIZIRIDIUM) **fasciculatum**, sp. nov. Planta glabra, pedalis vel minor rarius altior, bulbo tenue, basi fibris parallelis rigidulis cincto et radicibus crassis vel tuberosis suffulto, caule in parte inferiore longius vaginato, foliis 3–4, radicalibus, planis, flaccidis, multinervibus, margine scabridulis, caule saepius longioribus; scapo fistuloso, leve, subcompresso; umbella capsulifera sphaerica, densiter multiflora; spatha late ovata, acutiuscula, venosa, umbella brevior; pedicellis flores saepius excedentibus; perigonio albido, basi tubuloso, superne late campanulato; petalis lanceolatis, acutis, aequalibus, stamina paullulo excedentibus; filamentis subulatis, integris, basi petalis adnatis, antheris cordatis; ovario subgloboso, breviter stipitato; stylo brevi.

Plants from 12–36 cm. high; bulb obsolete, the scape surrounded below from one-fourth to one-third or more of its length, with colourless sheaths, and from 2–4 cm. above the short compressed rootstock, with coarse parallel fibres; the rootstock also bears a tuft of fleshy subfusiform or cylindric roots, about 2 cm. long. Leaves reaching 20 cm. in length, and between 3 and 4 mm. in breadth. Umbel $2\frac{1}{2}$ cm. or less in diameter; spathe nearly 2 cm. long;

pedicel about one and a half times as long as the flower. Petals 5 mm. long, barely 1.5 mm. broad; stamens barely equal to the petals, anther .5 mm. long. Ovary conspicuously 3-furrowed, shortly stalked, 1 mm. long; style short, 2 mm. long. Fruit about 3 mm. long.

Hab. Tibet; Phari, *Dungboo*, July; Teling, *Dungboo*, August, 1879; Kang-me, north of Phari, *Dr. King's collector*, August, 1882; Khambajong, *Younghusband*, in flower, no. 89, July, 1903; *Prain*, in fruit, September, 1903; Gyangtse, *Walton*, no. 68, July to September, 1904.

A well-marked species, perhaps nearest the North Asiatic *A. odorum* L., from which it is distinguished by its smaller flowers, the coarse persistent fibres of the obsolete bulb-scale, and the absence of an oblique jointed rootstock.

Allium (RHIZIRIDIUM) **Hugonianum**, sp. nov. Planta glabra pedalis et ultra, bulbis cylindricis, vel interdum basi dilatatis, in rhizomate cæspitosis, tunicis exterioribus membranaceis, demum longitudinaliter laceratis; caule sicco subterete et longitudinaliter striato, nudo; foliis basalibus, caule brevioribus, sæpius 2-4, anguste linearibus, siccis sæpe plicatis; umbella densius multiflora, subhemisphærica; spatha univalve, albido-scariosa, alte concava, longius rostrata, umbella brevior; pedicellis floribus longioribus, basi bracteolis albidis raris fulcratis; perigonio globoso-campanulato, petalis cæruleis, oblongo-ellipticis, obtusis, cum nervo mediano conspicuo lineatis, exterioribus concavis, paullo minoribus; filamentis et stylo longe exsertis, filamentis exterioribus subulatis, interioribus basi dilatatis, interdum utrinque inconspicue unidentatis; ovario globoso, supra basin sacculis tribus deorsum spectantibus instructo; loculis biovulatis. (Plate 476 A.)

Leaves 15-20 cm. long, from barely 2 to 3 mm. broad, not quite so long as the slender scape. Umbel 2.5 to 3 cm. in diameter. Pedicels to 1 cm. long, flowers .5 cm.

Near *A. Bakeri* Regel, but differs in its more compact umbel, and slightly smaller bright blue flowers. Also near *A. cyaneum* Regel, which, however, differs in its dark fibrous-subreticulate outer bulb-scales, pedicels subequal to the flowers, &c.

Hab. North Central China; Shensi; Mt. Thae-pei-san, Mt. Ngo-san, Mt. Kifong-san, *Hugh*, September, 1899.

Allium (RHIZIRIDIUM) **plurifoliatum**, sp. nov. Planta gracilis glabra pedalis et ultra, bulbis cylindricis in rhizomate horizontale dense cæspitosis, tunicis exterioribus membranaceis deinde in fibras parallellas laceratis; caule tenue, terete, supra medium densius foliato; foliis scapum æquante vel paullo brevioribus, lamina, e vagina truncata, plana, basi angustata, superne longe acuminata; umbella laxiter pluriflora; spatha albida scariosa, inde decidua, umbella brevior; pedicellis floribus 2-4-plo longioribus; perigonio late campanulato, saturate roseo, petalis obtusis, exterioribus ovato-oblongis concavis, interioribus ellipticis, paullo longioribus; filamentis et stylo exsertis, filamentis exterioribus tenuiter subulatis, interioribus cum basi dilatata utrinque uni-vel bidentata; ovario e

basi breviter cylindrica latiore, sub medio cum sacculis tribus deorsum spectantibus instructo; loculis biovulatis. (Plate 476 B.)

Habit recalling that of *A. kansuense* Regel, but the stem more leafy. Bulbs .5–1 cm. diam. Lower part of stem enveloped in the closely overlapping sheaths. Blades 10–25 cm. long, 3–8 mm. broad. Scape about 1 mm. thick. Umbel 5–15-flowered, 2–5 cm. diam.; pedicel 1–2 cm. long; flowers 4 mm. long; filaments nearly twice as long as the petals; ovary barely 3 mm. long, style 5 mm. Seeds 2 mm. long.

Hab. North Central China; Shensi; Mt. Miao-wan-san, in flower, July; and Mt. Thae-pei-san, in fruit, August, *Hugh*; Szechuen, *A. Henry*, 7038.

The umbel and flowers recall those of *A. Bakeri* Regel (North India to Japan), to which Dr. Henry's plant is referred in the Chinese Flora in Journ. Linn. Soc. xxxvi. 120; but the flowers are smaller, and the habit of the plant distinct in the leafy stem.

A. KANSUENSE Regel. Also collected by *Hugh* at the same times and localities as the last species.

A. PRATTII C. H. Wright. This species, described in the Chinese Flora, from Szechuen, was collected by *Hugh* in three localities in Shensi, Mt. Ngo-san, Mt. Miao-wan-san, and Mt. Thae-pei-san in July and August, 1899.

A. MACRANTHUM Baker. Originally described by Baker from the Sikkim Himalaya, this species occurs also in Tibet, including Chumbi and Phari, where it was collected on Major Younghusband's recent frontier commission, and in North Central China, from which we have specimens from *Hugh* from Mts. Miao-wan-san and Thae-pei-san, Shensi.

Allium (MOLIUM) tubiflorum, sp. nov. Planta glabra pedalis vel minor, bulbis ovatis ad subglobosis, solitariis, tunicis albidis, scariosis, integris; caule erecto, subcompresso, scabridule striato-angulato, basi foliato, folia anguste linearia paullo superante; spatha univalve lateraliter fissa, breviter acuminata, quam umbella laxiter pluriflora circa duplo brevior; pedicellis inæqualibus, perigonium triplo vel pluries excedentibus; petalis saturate roseis, basi in cupulam coalitis, demum reflexis, oblongis, obtusis, nervo medio saturatiore notatis, quam stamina plus duplo longioribus; filamentis subulatis, e tubo perigonii oriundis; ovario ovoideo, stylo subæquale cum stigmate trilobulato coronato. (Plate 476 C.)

Smaller bulbs ovate, about 1 cm. in diameter, larger becoming globose and more than 2 cm. diam. Leaves narrowing towards the sheath, reaching 20 cm. long and 2 mm. wide. Scape to 27 cm. long by 1.5 mm. diam. Umbels with ten or more flowers, the pedicels lengthening as the flower gets older, reaching 3 cm. or more; spathe about 1.5 cm. long. Petals 7 mm. long, united for nearly one-third of their length into a narrow cup, limbs ultimately reflexed. Filaments united below with the perianth-tube, free portion 1.5 mm. long, anther 1.5 mm. long. Ovary 1.5 mm. long.

Near *A. chinense* Don, from which it is distinguished by its less

robust habit, lax umbel with markedly unequal pedicels, and blunt reflexed petals.

Hab. North Central China; Leunteon, Feng-ho-san, *Hugh*, August, 1897; and Shensi, Mt. Ngo-san, *Hugh*, September, 1899.

Fritillaria flavida, sp. nov. Planta glabra pedalis vel altior, bulbo multisquamoso, squamis crassis, lanceolatis; caule gracili; foliis circa 10, sparsis, anguste linearibus, florem excedentibus, in parte caulis superiore magis frequentibus, longioribusque, supremis tenuioribus et sæpe apice flexuosis, ecirrrosis; flore solitario, declinato, flavido, aperto 5 cm. lato; petalis pæne e basi patentibus, oblongo-lanceolatis, interioribus paullo latioribus interdum oblongo-ovatis, acutiusculis vel interioribus interdum obtusiusculis, supra nectarium basale oblongum, leviter impressum, fimbriato-cristatis et purpureo punctatis; staminibus perianthio haud duplo brevioribus; ovario oblongo, anguste alato, quam stylo paullo brevior, stigmate capitato, trilobulato.

Bulbs 1.5–2 cm. thick, scales (nine to ten or more) about 2 cm. long, spreading upwards. Upper leaves 7–12 cm. long, 4–1.5 mm. broad. Petals pale yellow, or white streaked with yellow, about 2.5 cm. long, the outer 8–10 mm. broad, the inner 8.5–12 mm. Stamens 15–16 mm. long, anthers 4–5 mm. Ovary barely 1 cm. long, style slightly longer.

Near the Himalayan *F. Stracheyi* Hook. fil., from which it differs in its yellow flowers with rather narrower petals.

Hab. Tibet; Yuo-so, *Dr. King's collector*, June 29th, 1882, "flowers pale yellow"; Chumbi, Koo-ma-py-a, *Dr. King's collector*, July 29th, 1884, "flowers light yellow," no. 611; Chumbi and Phari, Pit-zee-lu, *Dungboo*, July, 1879, "flower yellow"; Chumbi and Phari, Cho-leh-la, near Chumbi, *Dungboo*, July 3rd, 1878, "flower white streaked with yellow."

TOVARIA YUNNANENSIS Franchet in Bull. Soc. Bot. Fr. xliii. (1896) p. 48. There is no authoritative specimen of this in either of our great herbaria, but from the description I am unable to distinguish the Tibet and Yunnan plants.

Hab. Tibet; Chumbi, Do-ree-chu, *Dr. King's collector*, June, 1884, no. 443, "flowers dark green."

JUNCUS CASTANEUS Sm. Collected by *Hugh* in Shensi (Mts. Miao-wan-san and Ngo-san). The plant collected by *Pratt* at Tachienlu, Szechuen (no. 844), and referred by Mr. N. E. Brown, in the Enumeration of Chinese Plants (Journ. Linn. Soc. xxxvi. 164), to *J. himalensis* Klotzsch as a broad-leaved form of the latter, seems identical with *Hugh's* plant. *J. castaneus* is not included in the Enumeration, but *Buchenau* has recently referred to this species two specimens collected by *Giraldi* in Shensi (Engl. Jahrb. xxxvi. Beibl. 82, 19).

Juncus Kingi, sp. nov. Herba glabra perennis, caule terete, basi incrassata, stolonifero, cum vaginis latis membranaceis, et folio singulo longitudine $\frac{1}{2}$ – $\frac{3}{4}$ caulis æquante, cum auricula breve et lamina tubuliforme, tenue, subcylindrica, apice pungente; capitulo solitario, subsphærico, composito, densiter plurifloro, cum bractea

longiore foliacea; bracteis florentibus stramineis, tenuiter membranaceis, late ovatis, subacutis, uninervibus, flores haud æquantibus; floribus subsessilibus; perianthio glumaceo, sicco stramineo, segmentis lanceolatis, acutis, uninervibus, tribus interioribus exteriores paullo excedentibus; antheris breviter exsertis; ovario ovoideo-trigono, stylo tenuiter cylindrico ovarium excedente, stigmatibus 3, stylum subæquantibus; seminibus . . .

Stem about 25 cm. high, and 1 mm. thick, enveloped at the base for about 2 cm. of its length with broad membranous sheaths, pale chestnut-brown in colour with broad whitish edges, and bearing one basal foliage leaf. Leaf-sheath subcompressed, 3-5 cm. long, blade 8-18 cm. long by 1 mm. thick. Head 1.5-2 cm. diam.; subtending bract 1.7-3.5 cm. long. "Flowers yellowish-white." Perianth about 6 mm. long. Filaments of stamens 6 mm. long, anthers 2.5 mm. long. Style 2 mm. long.

Hab. Tibet; Kang-me, two days north of Phari, *Dr. King's collector*, August 3rd, 1882.

A member of the *Junci alpini* group (Buchenau's subgenus vi.), near *J. leucomelas* Royle, but distinguished by its densely, many-flowered, compound, straw-coloured head, shortly exserted anthers and stoloniferous habit.

Juncus spectabilis, sp. nov. Herba glabra perennis stolonifera, caule subcompresso, basi solum foliato, foliis super vaginas brunneas marcidas sæpe 2, vagina compressa, ligula rotunda, obtusa, castanea; lamina vaginam subæquans, haud ad caulis medium attingente, lineari-subulata, superne canaliculata; capitulo solitario densiter plurifloro; floribus brevissime pedicellatis, bracteatis; bracteis membranaceis, ovatis, multinerviis, castaneis, infernis majoribus plus minus acutis, infima interdum subfoliacea et capitulum subæquante; perianthii segmentis albidis, æqualibus, oblongo-ovatis, obtusis, trinervibus; antheris linearibus, valde exsertis, stigmatibus paullo exsertis; ovario ellipsoideo quam stylo longiore.

Stem 17-25 cm. high, a little over 1 mm. broad. Leaf-blades 4-5 cm. long, about 1 mm. broad. Head 1.3-2 cm. broad, about 12-flowered; lowest bract generally less than 1 cm. long, but sometimes leaf-like and 2 cm. long. Perianth 6 mm. long, exserted stamens ultimately about half as long again; anthers 3 mm. long. Ovary 2.5 mm. long; style 1.5 mm., stigmas barely 3 mm. long.

Hab. Tibet; Gyantse, *Walton*, July-September, 1904.

The inflorescence recalls *J. leucanthus* Royle, from which, however, it is at once distinguished by the absence of the cauline leaf. The species is near *J. Thomsoni* Buchenau, but is a much more robust plant.

DESCRIPTION OF PLATE 476.

A. *Allium Hugonianum* sp. nov. Plant. 1, flower; 2, alternate stamens and petals; 3, pistil; 4, portion of leaf.

B. *A. plurifoliatum* sp. nov. Plant. 5, flower; 6, an inner stamen with toothed base, and simple base of adjoining outer stamens; 7, pistil.

C. *A. tubiflorum* sp. nov. Plant. 8, flower; 9, single stamen and petal; 10, pistil; 11, portion of leaf.

A, B, and C, natural size; other figures $\times 4$.

NOTES ON THE FLORA OF SUSSEX.—II.

By C. E. SALMON, F.L.S.

(Concluded from p. 20.)

*†*Guizotia abyssinica* Cass. III. Rubbish-heap, Brighton! 1900; T. H.

*†*Ambrosia trifida* L. III. Perching Sands Farm! 1903; E. E.
Jasione montana L. I. Shottermill Common and Aldworth, Blackdown; W. M. R. Stedham Common; H. G. B. V. Near Catsfield, local, 1876; J. H. A. Jenner. VI. Fairlight, 1883; R. Paulson.

Wahlenbergia hederacea Reichb. IV. Balcombe Forest; D. VII. On the side of the great bog leading from Eridge Rocks towards Groombridge; Cooper. Buckhurst Park, 1904.

Phyteuma orbiculare L. II. Storrington Downs, abundant; M. C. IV. Downs above Kingston, 1900. Between Seaford and mouth of Cuckmere, 1902. V. Downs near Alfriston, 1902. VI. Fairlight (Andrews); E. N. B. in litt.

†*P. spicatum* L. VI. One plant in a meadow, Fairlight. Supp. i. to Nat. Hist. Hastings, 1883. No doubt this solitary example was accidentally introduced.

Campanula glomerata L. I. Lynch Ball and Bepton Downs; H. G. B.

†*C. rapunculoides* L. I. Self-sown weed in garden of Rother Hill, Stedham; H. G. B. If native anywhere in England, certainly not in Sussex, where it appears only as a weed in gardens or in equally suspicious localities.

C. patula L. I. Banks of Rother, Stedham; H. G. B.

Vaccinium Myrtillus L. *IV. Woods near Handcross; D.

V. Oxyccocos L. II. Chiltington Common! 1903; A. B. C.

Calluna Erica DC. var. **incana* Auct. II. Washington and West Chiltington Commons! 1903; E. E.

Erica Tetralix L. I. Aldworth, Blackdown; W. M. R.

Pyrola minor L. I. Winden Wood, Chilgrove; H. G. B.

Hypopitys Monotropa Crantz. I. Eastdean, near Houghton; Cooper.

*†*Statice Bonduelli* Lestib. III. Devil's Dyke! 1903; T. Stonelea. "Probably introduced with foreign seed," W. B. Hemsley. A native of Algeria.

Hottonia palustris L. III. Bramber ditches; H. H.

Primula acaulis L. var. *caulescens* Koch. IV. Wood by Chailey Common! 1902; T. H.

Lysimachia Nummularia L. III. Henfield levels; H. H.

L. nemorum L. IV. Woods between Coneyburrows and New Barcombe, and between Newick Station and Chailey Common; H. H. V. St. Leonards; W. M. R.

Anagallis arvensis L. var. **carnea* Schrank. III. Stubble-field, Brighton! 1903; T. H. This locality is in Sussex East; Watson's division of the county bisects Brighton.

A. cærulea Schreb. I. Bognor! 1903; M. C.

A. tenella L. I. Westergate; M. C. III. Henfield; H. H. IV. Balcombe Forest; D.

Centunculus minimus L. *I. On the common, Fittleworth, 1904; D. II. Horsham Common; Cooper. Chiltington and Wiggonholt Commons! 1903; A. B. C. IV. Leonards Lea, 1904; T. H. VI. Bathurst Wood, Battle! 1902; W. E. N. VII. Wood near Crowborough, 1901; T. H. Buckhurst Park, 1904.

Samolus Valerandi L. I. Arundel Park, by Swanbourne Lake; H. G. B. Pagham; D. Westergate, 1904. IV. Seaford; M. C.

†*Vinca major* L. IV. Norlington, near Lewes; scarcely wild; Cooper.

V. minor L. I. Edge of Redford Common (with deep purple flowers) 1903; A. J. Crosfield. III. Chanctonbury Ring; H. H. VII. Roadside near Worth Church, 1902.

Blackstonia perfoliata Huds. II. Storrington Downs; M. C. IV. Clayey fields at Lovell, near Cuckfield; Cooper. Balcombe Forest; D. V. By Waldron Down; Cooper.

Erythræa pulchella Fr. I. Near Fernhurst, 1902; A. J. Crosfield. III. Roadside, Wiston! 1903; E. E. VII. Near Forest Row, 1904; C. H. W.

E. capitata Willd. var. *sphærocephala* Towns. IV. Between Seaford and mouth of River Cuckmere, 1902.

Gentiana Pneumonanthe L. I. Barnet's Rough, near Woolavington; Cooper. II. Chiltington Common! 1903; A. B. C. VII. Crowborough Warren, 1902; A. Wallis.

G. Amarella L. var. **præcox* Raf. I. Near Whiteways Lodge, Arundel Park! 1903; A. Webster.

Menyanthes trifoliata L. III. Henfield; H. H. IV. Chailey Common; D. Little Ease Mill-pond, 1903.

Cynoglossum officinale L. V. Near Cuckmere Haven, on Eastbourne side; H. G. B.

*†*Asperugo procumbens* L. IV. Rubbish-heap, Rottingdean! 1904; T. H.

Symphytum officinale L. var. *patens* Sibth. I. Wood on bank of river below Stedham Mill; H. G. B. Near Arundel; Cooper; *II. Near Chiltington Common; E. E.

*†*S. tuberosum* L. II. Hedge near Slinfold Parsonage; Cooper.

*†*Anchusa officinalis* L. III. One plant on the cliff, Fishersgate, for many years! 1894; T. H.

*†*A. italica* Retz. I. Chichester, 1901; W. E. N.

Myosotis repens G. Don. *IV. Near Nether Walstead Farm, Lindfield, 1901. Buxted, 1902.

M. sylvatica Hoffm. *IV. Roadside between Balcombe and Worth! doubtfully native, 1904; T. H. *VI. Wood, Frant! in some abundance not far from cottages; doubtfully native, 1904; T. H.

Lithospermum officinale L. I. Aldwick; M. C. IV. Ramscombe; H. H.

L. arvense L. I. Bognor; M. C.

*†*Heliotropium europæum* L. I. Corn-field, near west coast of Thorney; fruiting well; 1903.

Volcrulus Soldanella Junger. I. Pagham; M. C.

Cuscuta europæa L. I. Furze in Thorney Island, abundant; Cooper. III. In the hedges, Portslade; Cooper.

C. Trifolii Bab. II. On cultivated clover on several farms near Horsham; J. W. W. III. Clover-field close to cement-works between Steyning and Shoreham, 1902; A. Wallis.

†*Lycium barbarum* L. *V. St. Leonards; W. M. R.

†*Datura Stramonium* L. V. Gardner Street, near Hurstmonceux; H. Friend.

Hyoscyamus niger L. IV. Seaford; M. C. V. Cliffs above Cuckmere Haven; H. G. B.

Linaria repens Mill. I. Rev. E. S. Marshall reports (Journ. Bot. 1902, 221) that he was unable to find this plant in the Rev. E. O. Edgell's locality at Pagham. I am pleased to record that the Rev. H. G. Billinghamurst saw a large patch there (to which it seems confined) in 1903. The same observer noted another small patch, in 1902, close to the road at Lodsworth Common, but it did not look native here. *III. Field by Dyke Railway! In considerable quantity, with *Viola tricolor*, but doubtfully native, 1903; T. H.

L. viscida Moench. IV. Seaford; M. C. Near Nether Walstead Farm, Lindfield, 1901.

Antirrhinum Orontium L. I. Bognor; D.

†*Mimulus Langsdorffii* Donn. *V. Bexhill, 1877; R. L. Hawkins. *VII. Scarlett's Mill, near Cowden, in stream forming boundary between Sussex and Kent; H. F. Parsons.

Limosella aquatica L. III. Broadmere Common; Cooper.

Veronica montana L. *II. Faygate, 1904. IV. Common in woods near Cuckfield; D. VII. East Grinstead; H. F. Parsons.

V. scutellata L. IV. Copyhold, Cuckfield; D. Near Nether Walstead Farm, Lindfield, 1901.

*†*V. peregrina* L. IV. Roadside near Wood's Nursery, Maresfield, 1902.

*†*V. Crista-galli* Stev. III. Plentiful on a bank by the roadside at Barrow Hill, Henfield! 1888, probably introduced by Borrer; T. H.

Euphrasia Rostkoviana Hayne. I. Shottermill Common; W.M.R.

E. nemorosa H. Mart. II. Near the Sun Oak, St. Leonard's Forest! 1900; J. W. W.

E. Kernerii Wettst. *IV. Between Seaford and Cuckmere Haven; 1902.

Bartsia viscosa L. *IV. Near Newick Station! 1897; T. H.

Lathræa squamaria L. *VI. Hastings and Ore. Supp. iii. Nat. Hist. Hastings, 1897.

Utricularia neglecta Lehm. VII. Small pond near east end of Holtye Common! 1904; C. H.

Mentha alopecuroides Hull. *IV. Staplefield Common! 1895; H. F. Parsons.

M. sativa L. VI. Marshy place, ascent from Fairlight Glen, 1886; E. de Crespigny.—Var. *paludosa* Sole. *IV. Plumpton! T. H.

M. rubra Sm. IV. Staplefield Common! 1895; H. F. Parsons.

M. Pulegium L. IV. Skeynes Hill; D.

Calamintha officinalis Moench. I. West Thorney, 1903. Box-grove, Halnaker, Eartham, and Binstead, frequent, 1904. III. Henfield! 1892; H. H.

Salvia Verbenaca L. III. Churchyard, West Chiltington; H. G. B. IV. Lewes; D.

*†*S. verticillata* L. III. By path near Warren Farm, near Racecourse, Brighton! 1903; T. H.

Nepeta Cataria L. III. Railway mounds beyond Patcham; H. H. IV. Ramscombe; H. H.

Scutellaria minor Huds. II. St. Leonard's Forest, 1903.

Marrubium vulgare L. Halknaker Hill, 1904,

Stachys palustris × *sylvatica*. I. Aldingbourne, 1904. *V. Lane by Horeham Common! 1903; E. E.

*†*S. heraclea* All. III. One plant near cultivated land, Race-hill, Brighton! 1900; T. H.

*†*Galeopsis Ladanum* L. (the true plant). III. Rubbish-heap, Brighton! 1900; T. H.

G. Tetrahit L. var. **nigrescens* Breb. II. Near Amberley Station! 1900; T. H.

†*Leonurus Cardiac*a L. *VI. Casual near farmhouse, Guestling! 1904; E. N. B.

Lamium amplexicaule L. *II. Storrington! 1903; M. C.

L. hybridum Vill. III. Cultivated land and roadside, Henfield! 1903; E. E. IV. Near Cuckfield; D.

*†*Ballota nigra* L. var. *ruderalis* Koch. III. From mill-waste, Fishersgate! 1897; T. H.

†*Teucrium Chamædry*s L. *VI. Ore; Cooper.

Plantago major L. var. **intermedia* Gilib. I. Aldworth, Blackdown; W. M. R.

P. Coronopus L. f. **bipinnatifida* Wirtgen. III. Brighton, 1902; L. Wilby.—Var. **ceratophyllum* Rapin. III. Aldrington Wharf! 1902; T. H.

*†*P. arenaria* W. & K. I. Bognor, casual, 1903; M. C. Fishbourne Mill, 1901.

Littorella lacustris L. IV. Pondlye near Cuckfield; D. VII. Bewbush Mill-pond, 1902.

*†*Amaranthus albus* L. III. Southwick Cliff! 1891; T. H. IV. Cultivated land, Rottingdean! 1900; T. H.

Chenopodium polyspermum L. a. *spicatum* Moq. *II. Near Storrington! 1903; A. B. C. V. St. Leonards; W. M. R.

C. Vulvaria L. VI. Near Rye; Mrs. J. Taylor.

C. rubrum L. I. Eastergate and south of Oving, 1904. *II. Storrington! and Greatham! 1903; A. B. C.—f. *pseudobotryoides* H. C. Wats. *III. Heaps of dusty road-metal between West Grinstead and Steyning, 1902; A. Wallis.

C. glaucum L. *III. Fulking! West Sussex, 1904; T. H.

Atriplex deltoidea Bab. var. **prostrata* Bab. (= *triangularis* Willd.). III. Shoreham Beach! 1904! T. H.

A. Babingtonii Woods, var. **virescens* Lange. III. Southwick! 1903; T. H.

**Salicornia ramosissima* Woods. III. Shoreham! 1901; and

Longwater, Lancing! 1904; T. H. V. Pevensey Bay! 1903; T. H. New to East Sussex.

S. stricta Dum. *III. Aldrington! 1901; T. H.

S. appressa Dum. III. Southwick! 1901; T. H.

S. radicans Sm. III. Aldrington! 1903; T. H.

Polygonum Raii Bab. III. Fishersgate! 1892; T. H.

**P. maculatum* Trim. & Dyer. I. Small pond south of Aldingbourne, 1904. *III. Broadmere Common, Henfield! 1904; T. H.

*IV. Pond between Streat and Plumpton! 1901; T. H. This locality is in East Sussex, and is a new record for that vice-county.

*VII. Bewbush Mill-pond, 1902.

P. Bistorta L. *IV. Field near Wood's Nursery, Maresfield, abundant, 1902; W. E. N. Field near Lindfield! 1902; R. S. Standen.

*†*Pagopyrum esculentum* Moench. I. Shottermill Common; W.M.R.

Rumex pulcher L. *IV. Malling and Southerham; H. H. Seaford; M. C. Lewes! 1902; W. E. N.

Daphne Laureola L. III. Abundant in woods near Edburton; Miss M. Robinson. IV. Roadside from Spithurst to Newick; H. H.

Thesium humifusum D.C. IV. Between Seaford and Cuckmere Haven, 1902. V. Hills near Alfriston; E. E.

Euphorbia platyphylos L. IV. Cuckfield; D.

[*E. pilosa* L., as a native Sussex plant, if relying upon Arnold's "Blackbrook Wood" locality, can no longer stand. The specimen, from the herbarium of Mr. W. B. Hemsley (who included it in his "Outline"), is in the Brighton Museum, and is *E. amygdaloides*. Messrs. Nicholson, Ellman, and Standen have searched in vain in Blackbrook Wood for *E. pilosa*.]

†*E. Esula* L. *III. Near Racecourse, Brighton! 1904; T. H. *IV. Among dwarf furze, Race-hill, Lewes! 1899; H. T. Jenner.

E. exigua L. A remarkable form, prostrate, with crowded leaves, particularly on the barren shoots, occurs on the west shore of Thorney Island; possibly a truly native situation, 1903. See Bot. Ex. Club Rep. 1901, p. 26. — Var. **retusa* D.C. I. Plentiful and well-marked on the railway cutting near Selham, 1902.

Mercurialis perennis L. var. **ovata* Steud. III. Hurstpierpoint; Mitten. Bab. Man. 8th ed. 1881, 317.

Urtica dioica L. var. **microphylla* Hausm. I. Roadside near West Thorney, 1903.

Parietaria officinalis L. var. **fallax* G. & G. I. Pagham Churchyard! 1902; A. H. Wolley-Dod.

Carpinus Betulus L. *VII. Between Faygate and Bewbush Mill, 1902.

Quercus Robur L. var. *intermedia* Don. III. Road north of Henfield! 1903; E. E. IV. Plumpton! 1904; T. H.

Salix pentandra L. III. Edburton! 1901; T. H.

S. viridis Fr. *III. Tongdean! and Poynings! 1901; T. H.

S. cinerea L. var. *aquatica* Sm. *III. Chalk mounds, Pangdean! T. H.

Populus tremula L. *II. Roadside hedge between Billingshurst and Itchenfield; coppice on high ground above Warnham. In each case barren trees, which are extremely rare in West of

England; J. W. W.—Var. **glabra* Syme. II. Near Billingshurst, 1902.

P. canescens Sm. *II. In coppices on the Rudgwick plateau, undoubtedly native; J. W. W.

Empetrum nigrum L. II. Newberry, on the Greatham side of the ditch that bounds the two parishes, but in very small quantities; Cooper.

Elodea canadensis Michx. *IV. About Lewes, abundant; H. H.

Malaxis paludosa Sw. VII. Near the Tilgate Ponds; Cooper.

Spiranthes autumnalis Rich. IV. Chailey Common, and plentiful near Cuckfield; D. Between Seaford and Cuckmere Haven, 1902.

Cephalanthera ensifolia Rich. I. Near Arundel, in wood near Whiteways Lodge! 1903; H. G. B.

Epipactis latifolia All. I. Aldworth, Blackdown; W. M. R. IV. Balcombe Forest; D.

E. media Fr. I. Fernhurst! 1902; A. J. Crosfield. *II. Two plants by the Hammer Ponds, in St. Leonard's Forest, 1900; J. W. W. IV. Copyhold, sparingly! D.

E. violacea Bor. *IV. Pondlye, Cuckfield! 1902; R. S. Standen. Copyhold, Cuckfield! D.

Orchis pyramidalis L. II. Storrington Downs; M. C.

O. ustulata L. V. Downs at Jevington; Cooper,

O. latifolia L. I. Westergate, near Aldingbourne! 1903; A. B. C. Fishbourne; M. C. III. Henfield Common! T. H.

**O. latifolia* × *maculata*. III. Henfield Common! 1901; T. H. "I think this agrees with the supposed hybrid named above. Habit most of *latifolia*, but lip 3-lobed and spur more slender," R. A. Rolfe.

Herminium Monorchis R. Br. II. Rackham Hill, in considerable abundance in a limited area! 1903; A. B. C.

Habenaria conopsea Benth. I. Fairmile bottom, by road from Whiteway lodges; H. G. B.

H. viridis R. Br. II. Rackham Hill, very abundant! 1903, and Storrington Downs, sparingly; A. B. C.

H. bifolia R. Br. I. Redford Common, 1903; A. J. Crosfield. III. Ditchling Common; H. H.

H. chloroleuca Ridley. I. Foot of downs near Graffham, 1901. III. Steyning; H. H. IV. Wood by main road from Cooksbridge to Chailey, nearer Chailey; H. H. *VII. Holtye; H. F. Parsons.

Iris fœtidissima L. I. Thorney Island, 1903. V. On the rocks at Eastbourne; Cooper.

Narcissus Pseudo-narcissus L. IV. Meadows near Balcombe Forest, and near Cuckfield; D. Near Hendall Farm, Maresfield. 1902. VII. Worth.

†*N. biflorus* L. Field on High Buildings Farm, Fernhurst; Britten.

Polygonatum multiflorum All. I. Singleton; Cooper.

Allium ursinum L. III. Poynings, and near Wolstonbury in two places; H. H. IV. Near Sloop Inn, Lindfield; D.

A. vineale L. *V. Field near Hollington Wood; H. Friend.

†*Ornithogalum umbellatum* L. I. Near Fernhurst, in wood on High Buildings Farm called "Oliver's Bottom"; H. G. B.

[*Colchicum autumnale* L. II. Reported to T. H. as being found by Mr. Belcher in a meadow a considerable distance from a house at "Northlands," near Warnham. Requires confirming.]

Paris quadrifolia L. *VI. Westfield. Nat. Hist. Hastings, Supp. iii., 1897.

Juncus squarrosus L. *IV. Chailey Common; D.

J. compressus Jacq. I. East side of Bosham Creek, 1903.

J. obtusiflorus Ehrh. V. Bo-peep. Nat. Hist. Hastings, Supp. iii., 1897.

Luzula Forsteri DC. II. Near Loxwood, 1903. IV. Bank between Cuckfield and Staplefield; D.

L. maxima DC. VI. Wood near Old Roar, Hastings, 1887; R. Paulson.

Sparganium neglectum Beeby. I. Duncton Common, 1901. Midhurst Common, 1902. Near Colworth, 1904. V. Marsh ditch near Eastbourne; F. C. S. Roper. *VII. Near Holtye! 1904; C. H. W. Withyham and near Buckhurst House, 1904.

Acorus Calamus L. I. Swanbourne Lake, Arundel; H. G. B. Possibly introduced with *Cladium*. *VII. Withyham, 1904.

Alisma Plantago L. var. *lanceolatum* Afz. I. Bosham, 1903. Near Colworth, 1904. *III. Near West Grinstead Station, 1902; A. Wallis. *IV. Ditch behind Southover Priory! 1902; H. H.

A. ranunculoides L. III. St. John's Common; Cooper. IV. Little Ease Mill-pond, near Cuckfield, 1903. Towards Iford; H. H.

Butomus umbellatus L. III. Henfield; H. H. IV. Seaford; M. C. VI. River Brede, foot of Brede Hill, and foot of Winchelsea Hill towards Icklesham, 1887; R. Paulson.

Potamogeton alpinus Balb. *IV. Muddy ditch, Barcombe Mills! 1901; T. H.

P. densus L. *III. Dyke stream and Clayton pond; H. H. IV. Lewes levels; D.

P. acutifolius Link. *II. Amberley; and *III. Henfield; W. Borrer, 1826. (Garry in Journ. Bot. Supp. 1904, 200.) IV. Ditch near Ouse, beyond Hamsey! 1902; H. H.

P. obtusifolius M. & K. *IV. Barcombe Mills! 1901; T. H.

Zostera marina L. var. *angustifolia* Fr. V. River Cuckmere, near Exeat, 1902.

Eleocharis acicularis R. Br. II. Horsham Common; Cooper. This common does not exist, I believe, now.

E. multicaulis Sm. I. On the common, Fittleworth, 1904; D.

Scirpus fluitans L. II. Pond, Lily-beds Wood, St. Leonards, 1903. III. Near Ashington! 1903; A. B. C. Brewhouse Pond, 1903; D.

S. setaceus L. *II. Near Springfield and Leechpool Farms, St. Leonards, 1903. IV. Near mill-pond next Pondleigh! 1903; D.

S. sylvaticus L. II. Roadside swamp a mile north-east of Horsham; J. W. W. Chilton; M. C. *IV. Roadside between Ansty and St. John's Common, and very common in woods and marshes at Copyhold, Cuckfield; D.

S. Caricis Retz. I. Westergate, near Aldingbourne! 1903; A. B. C.

Rynchospora alba Vahl. II. Chiltington Common! 1903; A. B. C. VII. Crowborough; M. C.

Carex divisa Huds. VI. East of Rye, 1900.

C. arenaria L. II. Inland at Storrington Common, 1903; A. B. C.

C. echinata Murr. var. **Leersii* (F. Schultz) (*fide* G. Kükenthal). V. Near Wilmington! 1903; T. H.

C. axillaris Good. I. Between Pagham and North Berstead! 1903; A. B. C. Near Felpham; M. C. *II. Loxwood, 1903. *IV. Copyhold, Cuckfield! 1902; D. Streat Lane! 1902; T. H. VI. Guestling. Nat. Hist. Hastings, Supp. iii., 1897.

C. Bœnninghausiana Weihe. *IV. One clump near the river at Lindfield, 1901.

C. curta Good. *I. Midhurst Common, 1902.

C. acuta L. I. Midhurst Common, 1902.

C. Goodenoughii Gay var. **serta* Fleischer (*fide* G. Kükenthal). I. Midhurst Common, 1902.

C. pallescens L. I. Jay's Furze, Lavington, 1902. *II. Loxwood, 1902. Wood near Leechpool Farm, St. Leonards, 1903. IV. Copyhold, Cuckfield! 1903; D.

C. panicea L. var. **tumidula* Laest. IV. Near Nether Walstead Farm, Lindfield, 1901.

C. pendula Huds. IV. Copyhold, Cuckfield; D.

C. strigosa Huds. *IV. Copyhold, Cuckfield! 1903; and near Horsted Keynes! 1904; D.

C. laxigata Sm. II. Wood near Leechpool Farm, St. Leonards, 1903. IV. Copyhold, Cuckfield! 1903; D. Near Nether Walstead Farm, Lindfield, 1901; and Buxted, 1902. VI. Mayfield; Cooper. VII. Swampy ground just north of Balcombe Tunnel! 1902; R. S. Standen.

C. distans L. V. Flat beyond Marina, St. Leonards, 1886; E. de Crespigny.

C. (Ederi) Retz. var. **elatio*r Anderss. (*fide* G. Kükenthal). I. Near Graffham, 1901. II. Pond, Storrington! 1900; T. H.—Var. **cedocarpa* Anderss. VII. Copthorne Common, 1891.

**C. flava* × *(Ederi)* (*fide* G. Kükenthal). IV. Copyhold, Cuckfield! 1903; D. VII. Near Colman's Hatch, Ashdown Forest, 1896.

C. hirta L. var. **hirtaformis* Pers. IV. Baldsdean, on the downs! East Sussex, 1903; T. H.

C. Pseudo-cyperus L. Canal north of Loxwood, 1903. *IV. Near Copyhold, Cuckfield! 1903; and near Hamsey Place; D. VI. Stonestile Lane, Ore, and Icklesham, 1887; R. Paulson.

C. acutiformis Ehrh. II. Near Brewhurst Mill, Loxwood, 1903.

C. rostrata Stokes. II. Chiltington Common! 1903; A. B. C. *VI. Peppering Powder Mill Ponds. Nat. Hist. Hastings, Supp. iii., 1897.

C. vesicaria L. II. Canal-bed, Loxwood, 1902; and near Brewhurst Mill, 1903. IV. Copyhold, Cuckfield! 1903; D. Lindfield, 1901. VII. Lake near Thornhill Farm, Ashdown Forest, and near Forest Row Station, 1903.

*† *Panicum miliaceum* L. IV. Waste ground near the Corporation Wharf, Lewes! 1901; W. E. N.

† *Setaria viridis* Beauv. *I. Bognor, on waste ground near new roads! D. *IV. Lewes, on ground in the Priory, where excavations were in progress in 1901; D.

† *S. glauca* Beauv. *I. Bognor, as above; D. *III. Henfield, cultivated ground! 1903; E. E.

*† *Phalaris aquatica* Desf. IV. Railway-yard, Newhaven! 1903; E. E.

Alopecurus fulvus Sm. IV. Pond between Ansty and Hurst-pierpoint! D. *VII. Between Wych Cross and East Grinstead; E. E. Bewbush Mill-pond, 1902.

*† *Phleum tenue* Schrad. IV. Shortbridge brooks near Uckfield! 1895; E. H. Farr.

* *Polypogon littoralis* Sm. I. Thorney Island, 1904. An addition to Sussex. A few days after gathering *P. littoralis* at Porchester, in Hampshire, I made a special search for this in Thorney Island, and was rewarded by finding several pieces in flower, although the bulk of the spikes were quite brown and brittle at this late date (Sept. 9th). Both at Porchester and in this Sussex station, *P. littoralis* was accompanied by *P. monspeliensis* and *Agrostis alba*, and there are good grounds for believing it to be a hybrid between these two grasses.

Calamagrostis epigios Roth. I. Pagham; M. C.

Gastridium australe Beauv. III. Near Billingshurst! 1904; A. J. Crosfield. *IV. Near Cuckfield, abundant; D.

*† *Cynosurus echinatus* L. III. Cultivated land, Henfield! 1903; E. E. VI. Near Hastings, very sparingly (not recently); Cooper.

Poa compressa L. II. Rough pasture (recently enclosed common) at Ellen's Farm, Rudgwick, abundant; J. W. W. IV. Copyhold, Cuckfield! D. Lewes! and hedge-bank, Chailey North Common! 1902; W. E. N.

P. bulbosa L. VI. Near Rye! 1890; Fox Wilson.

P. nemoralis L. IV. Copyhold, Cuckfield; D.

Glyceria distans Wahl. V. Beach beyond Marina, St. Leonards, 1886; E. de Crespigny.

G. plicata Fr. I. Linchmere to Fernhurst; W. M. R.

G. Borreri Bab. *I. Near West Thorney, 1903.

Festuca procumbens Kunth. I. Bognor! 1903; M. C.

F. rottbœllioides Kunth. IV. Seaford; M. C.

F. ambigua Le Gall. *II. Old wall, Amberley! 1898; T. H.

* *F. ciliata* Danth. III. In October, 1904, I detected this species amongst some specimens sent me by Mr. Hilton from Brighton. By the help of Mr. Townsend's excellent description in *Fl. Hants*, p. 648, 1904 ed., it was *ciliata* beyond a doubt. In November of the same year I was able to visit the spot with Mr. Hilton and Mr. Ellman. The locality is a piece of chalk down close to some houses and a new road at the back of Brighton, and threatened by buildings sooner or later; it is in v.-c. 14, East Sussex. It appears that many years ago this land was under the plough, but no signs of cultivation remain beyond a few examples of *Lolium italicum*. Mr. Hilton reports that the plant was again seen in May, 1905, in fair quantity: it is an early grass.

F. Myuros L. I. Wall near Barnham! 1904; T. H. Ruins of Cowdray, 1904; D.

F. sciuroides Roth. I. Bognor; M. C. *II. Chiltington; M. C. IV. Near Cuckfield, common! D.

*† *Bromus interruptus* Druce. III. Near Brighton, among sainfoin, abundant! 1904; T. H.

B. secalinus L. III. Roadside, Saddlescombe! 1904; T. H.—
Var. *velutinus* Schrad. *IV. Plumpton; E. E.

*† *B. squarrosus* L. IV. Field near Racecourse, Lewes Downs! D. Maresfield (not recently); Cooper.

Lolium temulentum L. III. Dyke Road, Preston! 1902; T. H.—
Var. *arvense* With. III. Casual in a garden, Brighton! 1904; T. H.

Agropyron caninum Beauv. IV. Wood near Little Ease Mill-pond, 1903.

Hordeum secalinum Schreb. I. Midhurst, 1902. VII. Holtye Common! 1904; C. H. W.

H. marinum Huds. I. Bognor! 1903; M. C.

Elymus arenarius L. Recorded in Journ. Bot. 1900, 444, from Camber, but I am told it was introduced here by a man connected with the golf links. Golfing cannot be said to very often swell our lists of records!

Hymenophyllum tunbridgense Sm. VII. Rocks, Turner's Hill, 1903; W. E. N.

Asplenium Trichomanes L. VI. Near Rye; Mrs. J. Taylor.

Ceterach officinarum Willd. I. On wall, Climping; M. C.

Scolopendrium vulgare Symons. I. Redford, near Midhurst, 1903; A. J. Crosfield. Thorney Island, 1903. II. Canal north of Loxwood, 1903.

Cystopteris fragilis Bernh. I. Wall of a church in the Haslemere district! W. Whitwell, 1898. I could not see it there in 1903.

Lastræa Oreopteris Presl. VII. Holtye Common; H. F. Parsons.

L. Filix-mas Presl. var. **affinis* Bab. V. Near Berwick! 1903; T. H.

Ophioglossum vulgatum L. I. Field near Binstead Park, Arundel; H. G. B. IV. Very common in fields near Cuckfield; D. V. Bexhill; W. M. R.

Botrychium Lunaria Sw. I. Arundel, by footpath near Park Bottom! 1904; H. G. B.

Equisetum maximum Lam. IV. Balcombe; H. F. Parsons. V. Ratton Decoy; D.

Lycopodium clavatum L. *IV. On the common not far from Birchgrove School, below Divall's Farm, 1898; J. E. Clark. VII. Wych Cross, and near the quarry in Hindleap Warren, 1902; J. E. Clark. Crowborough; M. C. Holtye Common; H. F. Parsons. Worth Forest, 1902.

Pilularia globulifera L. IV. Pondleigh, near Cuckfield; D. Pond, Slaugham Common! 1901; T. H. VII. Bewbush Mill-pond, 1902.

Chara hispida L. *IV. Ditches, Hamsey! 1893; T. H.

A NEW ALOE FROM ANGOLA.

BY ALWIN BERGER.

THANKS to Sir Thomas Hanbury, I was able to study the Aloes preserved in the Royal Herbarium at Kew and those of the British Museum, which latter contains the types of the species collected by Welwitsch in Angola, and described by Mr. J. G. Baker. I was very happy to find Welwitsch's carefully pressed specimens accompanied by many valuable notes by the famous collector, made from the living plants.

Very little has since been collected in this region, and I was therefore much surprised to find on the recently added sheets a plant which I at once recognized as a new species. The specimen consists only of a lateral branch of the inflorescence and the half of a leaf, split longitudinally, so that its exact outlines and width cannot be stated.

A note on the label, by the collector, John Gossweiler, runs like this:—"Native name, 'Quicalango.' This plant is found on every hut that is occupied by man and wife. The plant is simply taken from the field and placed on the roof, which consists of straw, where it is secured by a few sticks; it continues growing for years, of course, and its purpose is to bless the couple with a large number of children."

From Mr. Gossweiler's note and from the specimen I have drawn up the following diagnosis:—

Aloe pædogona Berger, sp. n. Acaulis; folia ensiformia, vix 45 cm. longa, sæpe purpurascentia, ad margines rectos haud si evertos dentibus basi crebrioribus superne remotioribus instructa, dentes basales deltoidei minores erecti, superiores uncinato-incurvati, 3 mm. longi et 10–40 mm. distantes; ima apice integra. Inflorescentiæ valde ramosæ usque 2 m. altæ scapus validus, basi 5–7 cm. diam.; floribus viridi-flavis conspicuis in racemis brevibus circ. 7 cm. longis congestis; rami bracteis vacuis longe acuminatis remote munitis, bracteæ florigeræ basi lanceolatae scariosæ sub 3-nerviæ, longe cuspidatæ, apice demum recurvatæ, 15–25 mm. longæ et 4 mm. latæ; pedicelli 25–30 mm. longi erecto-patuli; perianthium basi longissime (per 6 mm.!) et tenuissime stipitato-angustatum et hic pedicello vix crassius, circa ovarium ovato-inflatum, dein constrictum et faucem versus ampliatum, rectum vel decurvatum, circ. 35 mm. longum, segmentis apice tantum liberis; filamenta inclusa; stylus demum exsertus. Pedicelli fructiferi, demum 5 cm. longi; capsulæ per 10–11 mm. stipitatæ et 25–30 mm. longæ, chartacæ, subtrigonæ. Semina oblonga late alata et 10–11 mm. longa, griseo-fusca.

Angola: at Malanga, June, 1903; *John Gossweiler*, no. 946! (Herb. Mus. Brit.).

Mr. Gossweiler remarks:—"A perennial with the habit of an aloe. Leaves to 18 in. long, often purplish green; flower-scape 6 ft. high, 2–3 in. in diameter, and much branched towards the

top; flowers greenish yellow, quite showy. In open thickets in company of high grasses."

It seems from this that it is an acaulescent plant. It certainly belongs to my group *Grandes*; its nearest ally may be *A. andongensis* Baker. The "perianthium basi stipitato-angustatum" of *A. padogona* is very conspicuous, and more strongly pronounced than in any other species. This becomes very evident on the ripe capsule.

Baron von Mechow's expedition collected near Malanga also a few fragments without leaves (*Rensch*, no. 484! flow. March, 1880, Herb. R. Berol.), which I now recognize as the same plant.

NEW BRAMBLES FROM SOUTH WALES.

By REV. W. MOYLE ROGERS AND REV. AUGUSTIN LEY.

THE following paper was suggested by a short visit paid by us to Glamorganshire during July and August, 1905. It seems a favourable moment for describing some marked brambles met with both in this and previous years, in view of the work at present being done in the botany of Glamorgan by the Rev. H. J. Riddelsdell, who took part in many of the expeditions made. It has been thought advisable, for the sake of completeness, to add also the description of a closely allied Scottish form. When no name is quoted, we are ourselves responsible for the records.

RUBUS GODRONI Lec. & Lam., var. *FOLIOLATUS*, var. nov. Leaflets small roundish-obovate cuspidate, the terminal scarcely larger or broader than the intermediate, simply finely serrate, not glossy above, light green or grey, not white, beneath. Prickles shorter than in type, strong, straight or slightly falcate. Panicle very long, narrow, with long ultra-axillary part, its leaves similar to those of the stem, its rachis bearing numerous strong curved thorns. Name suggested by the numerous small leaflets of the stem and panicle.

Localities. — *Brecon*: Tawe Valley from Craig-y-nos Castle to below Pont-ar-dawe. Neath Valley near Aberpergwm.—*Glamorgan*: Neath Valley near Glyn Neath Station. Hill-sides near Neath.—*Cheshire*: Near Larkton Hill, Major Wolley-Dod! First noticed at Aberpergwm about 1890.

R. LASIOCLADOS Focke, var. *LONGUS*, var. nov. Near var. *angustifolius* Rogers; from which it differs by the very long arcuate-prostrate stems; by the leaflets obovate, with long attenuate gradually acuminate points, less parallel sides, cuneate base, and compound irregular toothing, the under side ashy-felted; and by the singularly long attenuate bracts subtending the uppermost panicle-branches. Prickles of the rachis usually very numerous, long and straight. Although clearly very near the var. *angustifolius* Rogers, this plant differs conspicuously from that variety in the field, and seems to merit recognition in print.

Localities. — *Glamorgan*: Neath Valley: very abundantly in the neighbourhood of Neath itself, and again at Resolven, seven miles

up the Neath Valley. First noticed in 1905. A plant observed by Rev. E. S. Marshall as frequent between Aberayron and Newquay, Cardigan, seems to come very near this variety.

Further study has shown it to be desirable to separate *R. ericetorum* Lefv. from *R. Lejeunei* W. & N., with which it has been associated in the *Handbook of British Rubi* and in the *London Catalogue*, ed. 9, and to restore it to specific rank. It seems further evident that *R. ericetorum* Lefv. is more closely connected by other forms with *R. sertiflorus* P. J. Muell. than had been realized when the *Handbook* was published. Hence the following rearrangement is proposed:—

RUBUS ERICETORUM Lefv.

Var. CUNEATUS, var. nov.

Subspecies SERTIFLORUS (P. J. Muell.).

Var. SCOTICUS, var. nov.

R. ERICETORUM Lefv. Stem very stout, long and leafy, somewhat sulcate and hairy, with numerous scattered stout-based pricklets, acicles, and stalked glands. Prickles very unequal, long, declining. Leaves large, quinate: leaflets obovate, with long acuminate points, narrowed towards the entire base, bright green above, with close grey felt beneath. Serration fine, compound towards the point. Panicle very long, with corymbose top, and distant divaricate cymose branches; its numerous simple leaves reaching nearly to the top. Rachis clothed with short lax hair, unequal stalked glands, and gland-tipped bristles; prickles slender, declining. Sepals reflexed, clothed externally with soft grey felt, which makes a cushion for numerous sunken or nearly sunken purplish glands. Petals large, pinkish or white; stamens far exceeding reddish styles.

Widely spread in South and West England, up to Cheshire: recorded from seventeen vice-counties.

Var. CUNEATUS, var. nov. Differs from the type in the following points:—Stem with the main prickles shorter. Leaflets longer, normally cuneate, terminal with rather shorter stalk; serration towards the point remarkably incised-lobate, with some of the larger teeth patent or recurved; under side of the leaf greener, thinly hairy. Panicle with longer ascending branches below, its top less interrupted, more rounded; its leaves similar to those of the stem.

Localities. — *Brecon*: Frequent in the Tawe Valley, especially near Abercrave and Ystrad-gynlais. Mellte Glen, above Pont-nedd-fechan. Near Penderyn. — *Glamorgan*: Neath Valley from Pont-nedd-fechan to Resolven. Near Neath town. Llantrissant and Ystrad-owen, near Cowbridge. Taff's Well, near Caerphilly. Abernant Park, Cwm Dare, and other stations near Aberdare, *Riddelsdeli*! — *Monmouth*: In the Went Wood, near Usk. First observed about 1890, in the Mellte Glen.

R. ERICETORUM subsp. SERTIFLORUS (P. J. Muell.). Armature throughout more radulan, less sub-koehlerian; prickles stouter, usually deflexed; intermediate arms few or none; stalked glands numerous. Type. Leaves with greenish grey felt beneath, and with fairly even shallow partly patent teeth. Rachis densely

villous-felted, with sunken glands, and few hooked prickles. Petals small, bright pink within, much paler externally.

Localities. — *South Devon*: Near Silverton, *G. B. Savery*! — *Hertford*: Bennington, *Coleman*! — *Monmouth*: Whitebrook and Llangattock-vibon-avel, near Monmouth. — *Hereford*: South and centre of the county, locally frequent. First found by W. H. Coleman in 1849! and labelled by him "*R. Radula*?"

Var. *scoticus*, var. nov. Stem and rachis more hairy: leaves with thicker browner felt beneath, the serration often patent; panicle-leaves less cuneate at base.

Localities. — *Dumbarton*: Balloch and Ardlui (*Marshall*), on Loch Lomond. — *Renfrew*: Kilmacolm; and Ashton, Gourock. — *West Perth*: Callander. — *Argyle*: Loch Long, *F. S. Marshall*! First observed in 1896.

R. HORRIDICAULIS (P. J. Muell.). Stem stout, bluntly angled, fuscous or ochreous, somewhat glaucous, nearly glabrous, thickly but unequally covered with stout-based arms of various lengths, those which are gland-tipped chiefly short. Large prickles scattered, unequal, deflexed or falcate, broad-based. Leaves 3-5-nate, large; with serration uneven, mostly shallow; green and often harsh beneath. Leaflets of nearly equal size, terminal subrotund truncate cuspidate; petioles and petiolules with crowded falcate prickles extending to midrib. Panicle broad pyramidal or nearly cylindrical; rachis very prickly with mixed arms and thin short hair; lower branches ascending, top truncate. Sepals triangular-acuminate clasping the hairy fruit. Petals pink or white; stamens long.

Localities. — *Brecon*: Glyn Tarell, Glyn Taff-fechan, and Glyn Tawe. — *Glamorgan*: Llantrissant, Pont-nedd-fechan, and Caerphilly. Abundant near Aberdare, *Riddelsdell*! — *West Sussex*: St. Leonards Forest, *J. W. White*! — *Leicester*: Lane near Buddon Wood. Saintfield, Co. Down, Ireland, a form, *C. H. Waddell*! First found at Pont-nedd-fechan in 1897, and named by Dr. Focke, who associated it with *R. saxicolus* P. J. Muell. Its right position, however, seems clearly in the Koehlerian section, next to *R. rosaceus*, sp. coll. Mentioned at p. 91 of the *Handbook*, under *R. saxicolus*.

GEORGE DON.

MR. DRUCE has published, in the *Notes from the Royal Botanic Gardens, Edinburgh*, for November, 1904 and February, 1905, a long account of "The Life and Work of George Don," occupying pp. 53-290. It forms an important portion of the interesting history of the Garden which Prof. Balfour is publishing in the "Notes," and which contains, in the November issue, a full account of John Mackay (1772-1802), with some of his letters and a list of records of some of the rarer Scottish plants. George Don succeeded Mackay, but Prof. Balfour, hearing from Mr. Druce that he "had worked out in critical detail the story of Don's botanical work and

of the discoveries of British plants with which Don's name has been associated," arranged that Mr. Druce's memoir should appear in the *Notes*. "Here and there his story has been modified, with his consent, in the light of facts not in his possession at the moment of writing, and other information has been introduced in footnotes"; these notes add materially to the value of the biography.

Prof. Balfour points out that "the foundation of this memoir is the story of Don's life given by Mr. J. Knox in the *Scottish Naturalist*, 1883-84," i.e. 1881, with certain corrections. Mr. Druce himself published (*Pharmaceutical Journal*, Aug. 16, 1902) a fairly long biography; and it may be suggested that the present memoir would not have suffered by condensation, not perhaps in the actual biography, but in certain adjuncts—such, for example, as the reprinting of Don's memoir on the varieties of *Pinus silvestris*, which occupies nearly four pages.

The biography is followed by a number of appendixes: A. on Don's "Reputed Discoveries"; B. his discoveries; C. his "Herbarium Britannicum"; D. his private herbarium; E. a reprint of Don's essay on indigenous grasses, from the Transactions of the Highland Society, 1807; F. a reprint of his account of the plants and animals of Forfar, from the "General View of the County of Angus," 1813; G. (and postscript) Don's letters. In the first Mr. Druce has brought together—we think in unnecessary detail—all that has been said about Don's "reputed discoveries," to which he has added elucidatory comments. Both quotations and comments would gain by condensation; on the other hand, it is difficult to explain the omission, from so exhaustive an account, of the notes attached to Don's specimens in the British collection of the National Herbarium. A number of these are quoted in Mr. Garry's *Notes on the Drawings for 'English Botany,'* published as an appendix to this Journal in 1903-4; but neither the *Notes* nor the Journal are included in the list of works consulted by Mr. Druce, and we have found no reference to them in his text.

One example of this omission will be found under *Sagina alpina*, entered as "*Sagina alpina*, Druce, in the *Scottish Naturalist*, p. 177 (1884)." Mr. Druce contents himself with saying, "Doubtless Don found this plant on Ben Nevis in 1794." Mr. Garry (p. 36) transcribes the note attached by Don to the specimen sent by him to Sowerby, in which he says, "I found it upon ben Nivis in Lochebar," and although the example was "a cultivated specimen" (*sic* in MS.), he adds that "it is in no way different from the wild, in appairance, found in 1794." Nor is it easy to see why Mr. Druce appends his own name as the authority for the species; in the *Scottish Naturalist* to which he refers the name stands as "*S. alpina*, E. B. 3"—a misquotation, as the plant there (ii. 177) stands as a variety of *S. maritima*, and Mr. Druce nowhere indicated that he regarded it as having any claim to specific rank. But, on the other hand, Don himself not only, as will be seen from Mr. Garry's transcript, distinctly writes: "*S. alpina*, this I believe to be a new species," but proceeds to give what he considered to be distinctive characters.

It would seem that, should the name have to be cited as that of a species—which does not appear to be desirable, as the specific distinctness of the plant from *S. maritima* is not maintained—it should stand “*S. alpina* Don MS. ex Garry, Notes, p. 36 (1903).” The omission of any reference to Don’s MS. notes is the more remarkable in that Mr. Druce, in the preface to his paper, speaks of having consulted the Museum collections, and refers (p. 70), to the preservation therein of many of Don’s original specimens.

Mr. Druce’s comments upon H. C. Watson’s criticisms of Don appear to us at times to be somewhat unduly severe. For example, under *Juncus tenuis*, he writes: “Mr. Watson deliberately ignored Mr. David Don’s confirmation of his father’s record, which was also overlooked by the other critics of Don’s record.” The only “confirmation” by D. Don is the affixing of his name to the record in Hooker’s *Flora Scotica* (1821), where “D. Don MSS. ined.” also follows the references to *J. gracilis*. That this name was given to the plant by George is clear from his specimen so labelled by himself (which Mr. Druce does not cite) in the British Museum Herbarium; and as Hooker does not mention him in connection with the plant, of which he was certainly the discoverer, it seems to us at least probable that “D.” is a misprint for “G.” This view is supported by the fact that in the seventh edition of the *British Flora* (1855), by Hooker and Arnott, in which the account of *J. tenuis* is rewritten, “G. Don” is substituted for “D. Don.” Under any circumstances it seems hardly fair to say that D. Don was “deliberately ignored” by Watson; Mr. Druce himself falls into a similar error in the opposite direction when he quotes as if of independent authority Gardiner’s *Flora of Forfarshire*, omitting Gardiner’s reference to “H. B. F.” (Hooker’s *British Flora*), in the earliest editions of which “D. Don” appears as the authority. Mr. Druce cites the name (in “quotes”) from *Flora Scotica* as “*J. tenuis*; D. Don, MSS. ined.”; but nearly six lines of type intervene between the name and the authority; *J. tenuis* is cited by Hooker as of Pursh—the “D. Don MSS.” belongs to *J. gracilis*.

It will be seen from the instances given that Mr. Druce’s work is open to criticism in details, but this does not detract from its general interest, although, as we have said, it would certainly gain by compression. His own suggestions as to how certain plants came to be included by Don seem to us in many instances inconclusive, and hardly worth printing, and some of his remarks are scarcely illuminative. Of the latter we take as an example the note under *Chærophyllum aureum*: “I have found a solitary specimen of a yellow-flowered Umbellifer, which I think is a *Chærophyllum* but not *aureum*, near a mill in Berkshire, but at present I have not been able to identify it”: of the former, this note on *Ranunculus alpestris*: “After Don’s precise statement, it appears very difficult to believe he was in error. It must be remembered that hardly any competent botanist has visited the Clova mountains at so early a date as the plant flowers to make a systematic search.* The

* This, as Prof. Balfour shows in a footnote, requires qualification; one of Graham’s botanical expeditions to Clova started “about the end of April.”

only alternative to me seems that Don might have gathered a specimen of the Batrachian group, and planted it in his garden, where he afterwards confused it with *R. alpestris*, but from Smith's specimen being in flower it does not appear probable unless Don sent to Smith on April 3rd a specimen from his garden." It is difficult to see how Don could have "planted in his garden" a water *Ranunculus* under circumstances which would lead to its confusion with a terrestrial species.

Prof. Balfour has an interesting postscript containing a correspondence between Dr. Neill and George Don the younger, which adds to the information contained in Mr. Druce's memoir. "In the light of this correspondence," says Prof. Balfour, "and its statements conflicting with some of those in the Memoir, we must conclude that at the present time our data are quite insufficient for the compilation of an accurate story of Don's early life."

TWO NEW RUBI.

By A. H. WOLLEY-DOD.

UNWILLING though I feel to add to the already long list of British Rubi, I have a counter-feeling, which I can never quite get away from, that either the existing descriptions must be made more comprehensive, or some well-marked and tolerably constant forms—call them "species" or "varieties," or what you will—must be neglected. The first proposition is, I fear, against the rules, and confusion rather than simplification would result if authors were allowed to amend their descriptions from time to time as new forms came to light: the alternative brings us face to face with the adoption of a Benthamite policy which does not commend itself to me. I do not mean it to be inferred that I advocate the description and naming of every bush which differs materially from others already described; but when distinct forms are found, covering a considerable area of country, even though locally, I think the science of botany is advanced rather than retarded by their description.

The following species and variety have been under my observation for the past three years at least, during which I have received invaluable assistance from the Rev. W. Moyle Rogers, without whose kind advice and suggestions, freely and readily given, I should never have attempted the task of adding to so critical a group of species as the fruticose Rubi.

Rubus castrensis, sp. nov. Stem arching-prostrate, angular, striate, and more or less furrowed, thinly hairy, with scattered inconspicuous sessile and subsessile glands, *olive-green*, or reddish in full exposure. Prickles *numerous*, *patent or declining*, *moderately strong*, not quite equal nor quite confined to angles. Leaves on rather short petioles, *strongly pedate*, *imbricate*, *olive-green*. Leaflets all broad and rather large, hairy above, more densely so beneath

but not felted, *coarsely, doubly or irregularly* crenate-serrate, the teeth wide and sharply cuspidate. Terminal leaflet *subrotund or broadly obovate-oval, with long cuspidate-acuminate point, cordate*, about three times as long as its petiolule; lateral narrower and rather smaller, basal considerably smaller and shortly petiolulate. Panicle *long, cylindrical-pyramidal, lax*, axillary branches three to six, the lowest ascending at an acute angle, with several racemously-disposed flowers, the upper successively more patent, with corymbose inflorescence, ultraxillary branches six to ten, *patent, each with one to four corymbosely-disposed* flowers. Rachis almost straight, quite eglandular, hairy below, densely so or almost felted above, its lower prickles rather short, stout, subpatent or declining, the upper and those on branches longer, more slender and more declining. Sepals *patent or loosely reflexed throughout*, greenish or greyish felted, usually not aciculate, with rather short cuspidate points. Petals oval, *quite white*. Stamens with white filaments, longer than green styles.

This species grows in considerable abundance in sandy (new red sandstone) field and roadside hedges west of Harthill, and about Larkton Lane, Cheshire, the two stations being about a mile apart. It does not, like several other Rubi, extend to the heathery hill-sides. Mr. Rogers first thought it to be *R. latifolius* Bab., but now agrees that it presents considerable specific differences from that species, as follows:—*R. castrensis* has a more hairy stem, with longer and more numerous prickles, leaves broader in proportion to their length, and more cuspidate, considerably more hairy beneath, the basal distinctly stalked; its panicle is much longer, more compound, much more strongly armed, and is quite eglandular, even on bracts. The long hairs on the sepals of *latifolius* also are almost or quite wanting on those of *castrensis*.

There is also considerable resemblance in dried specimens to *R. carpinifolius* W. & N., from which it differs in its less highly arching stem, and conspicuously in its much more olive rather than pale yellowish-green stem and foliage, its weaker and more patent prickles, and, above all, in its pedate leaves, with shorter-stalked much more orbicular cuspidate-cordate terminal leaflets the lateral imbricate, the toothing somewhat coarser and more patent. Its panicle, also, is longer and narrower, with more patent upper branches, much less strongly armed, and its sepals more spreading or even loosely reflexed.

RUBUS RHOMBIFOLIUS var. **MEGASTACHYS** var. nov. This differs from typical *rhombifolius* W. in the following characters:—*Stronger and more luxuriant*. Leaves *never felted* even in full sun, *toothing much shallower* and, though irregular, hardly double, the teeth broader and less finely pointed, every third or fourth patent; terminal leaflet *nearly regularly oval, not decidedly narrower below, the base usually cordate*, or sometimes subcordate. Panicle *broad, truncate and cylindrical*, or, more rarely, subpyramidal, with considerable ultraxillary portion, the lower branches much more patent, and all more numerous-flowered, usually with a few scattered glands, not only on bracts, and occasional glandular acicles. Petals paler

and *longer*, sepals only *loosely reflexed*, or subpatent, or, rarely, sub-erect with young fruit, almost always aciculate.

Plentiful on Walton Common, Surrey, where, however, it already stands a good chance of extirpation from the extension of the allotments. It is, however, found on most of the adjacent commons, certainly from Esher to Horsell, on some of which it has also been gathered by Mr. Britton, who has been kind enough to supply me with specimens of his gathering. Bushes connecting this with typical *R. rhombifolius* have also been found by Mr. Britton on Danbury Common, in Essex, and Sheen Common, Surrey.

Mr. Rogers points out that the above characteristics show that var. *megastachys* bears much the same relation to *R. rhombifolius* as var. *londinensis* does to *R. imbricatus* (*vide* Journ. Bot. 1903, p. 89), and thinks both varieties are produced by the very favourable conditions of soil on which they grow.

BOTANICAL EXCHANGE CLUB REPORT, 1904.

[THE following notes, which we have been unable to print earlier, are extracted from the Report of the Botanical Exchange Club for 1904, published in August of last year. The Report, by Mr. James Groves, "Editor and Distributor," is preceded by the "Secretary's Report," in the form of a letter, in which Mr. Druce gives a summary of "the chief items of botanical interest of the year." This may be a desirable addition to the Report, but we doubt whether it is necessary to include in it items subsequently given in the Report itself, or wise to make it the occasion for publishing new combinations. Nearly six pages are occupied by notes on *Rubus* for which Mr. Moyle Rogers is mainly responsible; *Hieracium*, on which Mr. E. F. Linton reports, occupies nearly as much space. We are glad to notice a considerable reduction in the number of notes which convey no definite information, and to observe that the Editor expresses his opinion as to the worthlessness of the distinctions on faith of which new varieties are too often introduced to our lists. We should be glad to see a further development of feeling in this direction, which might take the form of objecting to the publication of such trivialities, and to the inclusion of critical forms the types of which have not been seen by the recorder.—ED. JOURN. BOT.]

CERASTIUM TRIVIALE Link. Variety approaching *alpinum* Mert. & Koch. Damp precipice, Ystolion duon, Carnarvonshire, 14th July, 1904. This form is abundant in the damp parts of mountain precipices in North Wales, and reappears in South Wales at the Brecon Beacons. In the length of its petals it makes an approach to var. *alpinum*, but is nearer to the type than to this variety.—AUGUSTIN LEY. "I agree. It is a montane form with rather larger flowers and typical leaves. Of the Welsh plants for which

the name '*alpestre*' has been suggested the Brecon Beacon form seems to come nearest (in both leaf and flower) to the Forfar plant and Koch's description of var. *alpinum*. Intermediate forms also occur on several Scotch mountains."—E. F. LINTON.

PHYSOSPERMUM COMMUTATUM Spreng. In a wood on flinty soil in the neighbourhood of Burnham, Bucks, in great plenty over two to three acres. Found by Mr. R. Sperrin.* Gathered by me in Sept., 1904. A very interesting county record, extending as it does the range from Devon and Cornwall so much eastwards. This unexpected occurrence of such a very local western species led one to think it must have been introduced in recent times. I made a careful examination of the natural strip of wood in which it grows, but found no other suspicious plant, and the wood itself was formerly united to other woods in the vicinity. The *Physospermum* grew in great quantities over a somewhat limited area. During the years I worked that neighbourhood it was extremely dense brushwood, into which I did not penetrate, and was closely preserved. About three years ago the undergrowth was cleared, and that the *Physospermum* has not been introduced since is proved by some plants appearing through the bundles of faggots which were then cut. Although on dry flinty soil (the Upper River gravels) *Rhamnus Frangula* grew in it with *Euonymus*. In many ways the place reminded me of the wood at Bodmin where it grows. At present I am inclined to think the plant is indigenous there.—G. CLARIDGE DRUCE.

SENECIO SQUALIDUS L. var. *LEIOCARPUS*. Didcot, Berks, June, 1904. In all the floras which I have examined the achenes of *Senecio squalidus* are described as being pubescent, silky, or hairy, but in certain places, as in several localities in the Kennet Valley, at Reading, and at Didcot in Berks, plants occur with glabrous achenes. These present a similar range of variation in leaf-cutting to the normal plant with pubescent achenes. The specimens sent are a form with the leaves much less deeply cut (*forma integra*) than in the type. The Rev. E. S. Marshall was disposed to think that it might be a hybrid of *S. aquaticus* × *squalidus*. Very rarely *S. vulgaris* crosses with *squalidus*, but I can see no evidence of hybridity in these specimens, and Dr. Focke, to whom I sent a specimen, says, "I think your plant is a variety of *S. squalidus*, and is nearly the same as the var. *glaucescens* of Sicily." Dr. Focke kindly sent the following observations on the forms or subspecies of *S. squalidus* which he saw on the slopes of Mount Etna, where I have myself made a study of the forms of this variable species. "*S. ætnensis* Ten., leaves spatulate, slightly toothed or nearly entire; achenes glabrous. Grows in elevated regions of Mount Etna. *S. squalidus* var. *glaucescens* Spr., leaves irregularly and coarsely toothed; achenes glabrous or pubescent. Grows in an intermediate belt between the stations of *ætnensis* and *typicus*; it occurs frequently mixed with both forms. *S. squalidus typicus*, leaves irre-

* [On p. 5 the name is printed "W. R. Sherrin."—ED. JOURN. BOT.]

gularly pinnatifid, with lobulated or coarsely toothed lobes; achenes silky. Grows on the lower slopes of Etna. *S. squalidus* (*S. chrysanthemifolius* Poir., *S. siculus* All.), leaves bipinnatifid with narrow nearly linear lobes and lobules, achenes silky. Grows on low land in Sicily. The var. *glaucescens* is a connecting link or a hybrid between *atnensis* and *typicus*, two well distinguished plants. There occur frequently all intermediate plants between *glaucescens* and the two other species or varieties. The var. *chrysanthemifolius* seems to be only an extreme state of *typicus*." I saw this latter growing in the volcanic dust in the Strada Etnensis, and closely allied forms on dry gravel rubble near Oxford. I may here record the occurrence of *S. squalidus* at Southall in Middlesex, at Swindon in Wilts, and at Verney in Bucks.—G. CLARIDGE DRUCE.

CNICUS (?). Rough grassy ground about Nash Point, Glamorgan, July 1904. In patches sometimes several yards across, and extending along at least three or four miles of coast; generally close to the cliff edge where the ground has been undisturbed, but also in similar ground some little way up one of the small valleys leading down to the shore. The thistles of the neighbourhood are *Carduus pycnocephalus* L., *C. nutans* L., *C. crispus* L., *C. nutanti-crispus*, *Cnicus eriophorus* Roth., *C. palustris* Willd., *C. arvensis* Hoffm., and *C. acaulis* Willd. The last is not widely spread; it occurs sometimes in the immediate neighbourhood of the present plant. Probably the plant of Phyt. i. 780, which was gathered "between St. Donat's and Dunraven" by Westcombe, and named *C. tuberosus* Roth. In Phyt. iv. 519, T. B. Flower (1852) wrote that he thought "Westcombe's specimens could not be referred to *C. tuberosus*, but would possibly prove to be the *C. Woodwardii* of Mr. Watson, and having lately submitted them to that gentleman he arrived at a similar conclusion, and writes me: 'The plant looks so unlike *C. pratensis* that I do not wonder at the supposition of its being some other species.'" I have no record of *C. pratensis* occurring nearer than Porthcawl Sandhills, a dozen miles away, though I have not thoroughly searched all the neighbourhood of Nash Point; but the dry surroundings and the geological formation of the district (lias rock coming very near the surface) do not make the occurrence of *C. pratensis* *a priori* likely. This, coupled with the facts regarding the neighbouring distribution of *C. acaulis*, makes it very doubtful if the determination of *C. acaulis* $\times$ *pratensis* is correct. Moreover, the fact that the plant is scattered in many compact little patches over a considerable area, of which no doubt I have actually seen only one boundary, and that it has stood its ground for many years (if I am right in supposing it is Westcombe's plant), opens the question whether it is a hybrid at all. It produces ripe and perfect fruit. Mr. Spencer Moore suggests *C. acaulis* $\times$ *tuberosus*. A suggestion gathered by myself from the Brit. Mus. Herb. is *C. acaulis* var. *dubius* Willd. In neither case do the leaves look right for the Glamorgan plant, which moreover, I believe, has constantly a branched stem with long peduncled heads.—H. J. RIDDELSDELL. This reminded me at once of a form (or hybrid) of *C. pratensis* which I collected at Roundstone in 1885. The only obvious differ-

ence was in the broader leaves and their very coarse lobing. The Roundstone thistle, which has also occurred on the coast of North Wales, *vide* Mr. A. Bennett, was thought by Prof. Babington to be a form of *C. pratensis*, and proved fertile on cultivation. Though not identical in shape of leaf, I see no other difference. The involucre of the Nash Point plant are glabrous; so were our wild Irish plants; weather-worn, I think, for they proved cottony in the garden. The only possible partner out of the species named as growing about would be *C. acaulis*; but, beyond the glabrous involucre and the lobing of the leaves, I do not see in the armature and clothing of the leaves, the shape of the bracts or the fruit, any of the signs I should expect in that direction. I do not know *C. Woodwardii* from specimens. If it is a form of that hybrid, it is very much on the *C. pratensis* side.—E. F. LINTON.

STATICE MARITIMA Mill. Lydd, E. Kent, July, 1904. The plant with holotrichous calyx, which is much the rarer form so far as my experience goes in Britain. The common plant with a pleurotrichous calyx, that is, having hairs on the calyx-ribs only, while the interspaces are glabrous or nearly glabrous, is *S. linearifolia* Laterr. = *S. pubescens*.—G. CLARIDGE DRUCE. The amount of hairiness on the calyx in the British Thrifts varies considerably even on the same plant, and we do not think affords a sufficient character for specific distinction. In the present plant the hairiness spreads between the ribs in the middle, but above and below the grooves appear to be glabrous.—H. & J. GROVES.

URTICA ANGUSTIFOLIA A. Blytt. Open glade, Knighton Spinneys, Leicestershire, Sept., 1904. The best *angustifolia* I have seen in Leicestershire; there are many grades between this and *U. dioica* type.—W. BELL. “*U. dioica* var. *angustifolia* Wimm. & Grab.”—G. C. DRUCE. Unless this “variety” has some other character than the more or less narrow leaves, it does not seem worth distinguishing.—J. G.

BETULA INTERMEDIA Thomas. Ref. No. 2823. Stream-side (1400 ft.), near Bachnagairn, Clova District, Forfar, 29th June, 1904. I have no doubt that this plant is derived (as I suggested in *Journal of Botany* for 1901, p. 271) from seed of *B. pubescens* Ehrh., fertilized by pollen of *B. nana* L., *B. alpestris* Fr. being the product of the reverse process. The present case affords pretty conclusive evidence, as only *B. pubescens* was found in the locality itself, but *B. nana* was seen in plenty a mile or two away. This (No. 2823) was about twelve feet high, conspicuously differing from the surrounding *B. pubescens* (*B. glutinosa* Fr.) at a good distance by its much darker foliage, thickly interlacing branches, and peculiar rounded outline, which resembled that of a giant bush, rather than of an ordinary tree.—E. S. MARSHALL. Also sent by Mr. W. A. SHOOLBRED, from the same locality.

CYPERUS FUSCUS L. Peaty ditch near Weston-in-Gordano, North Somerset, 10th Sept., 1904. The experience of several years has shown that there is nothing to marvel at in the fact that this rare plant, in its Somerset locality, eluded observation

during so long a period. In the Walton Valley there may be twenty miles of ditches and possibly more. The farmers who rent the pasture are under obligation to rake out the main drains at least every four months, and in default are fined. How this plant, an annual, contrives to exist at all, is the marvel. For although, doubtless, much of it in fruit has at various times been thrown out and scattered on the adjacent land, we have never yet seen a specimen growing outside a ditch. It does not even grow on the ditch-banks, but only in shallow water at the bottom. In Sept., 1903, none could be found in those drains where the sedge was first observed, nor indeed anywhere else during a two hours' search. This year also the original locality was a blank. However, in another part of the moor we came upon about a hundred yards of luxuriant plants in good order.—JAS. W. WHITE.

CLADIUM JAMAICENSE Crantz. Wotton Underwood, Bucks, Aug., 1904. This addition to the Bucks Flora was found by Mr. A. Wallis, who has been a very kind and energetic helper in my task of compiling the county Flora. A large but solitary patch occurred in a pond on a duck-farm in a secluded part of the county, in the Vale of Aylesbury. It is on the Oxford Clay and in a low-lying district which once was doubtless much more fen-like than it is at the present time. I have been unable to find it elsewhere in the neighbourhood. At first I thought it might have been introduced from the large piece of artificial water at Earl Temple's mansion, but I have examined that situation and find it is not grown there. The habitat lies between the fen-ground of Otmoor and the Eastern fens, and its occurrence may be due to aquatic fowl.—G. CLARIDGE DRUCE.

WEINGAERTNERIA CANESCENS Bernh. In considerable quantity over a sandy field (once arable land) at Aberafan, Glamorgan, July, 1904. Also on the sandhills near by, and on the undisturbed sand within the area of Port Talbot Docks; all within a square mile area. There is no *a priori* reason why it should not be native here, as it grows in the Channel Islands and East Anglia. It is near docks and many introduced plants, but is too widely spread, even so far as I know it at present, for this consideration to weigh very heavily. The dock-plants tend to be confined to the dock area. It was never recorded by James Motley, who lived at Aberafan: but there are other important plants close by which he did not see. Further investigation is necessary before I can feel satisfied whether it is introduced or not.—H. J. RIDDELSDELL.

MOLINIA VARIA Schrank var. *MAJOR*. Bomere Pool, near Shrewsbury, Salop, Aug., 1904. This tall form with diffusely branched panicle, green with no trace of purple tinge, does not appear to have been hitherto recorded for Salop. It grows in the south-west margin of the pool, in company with *Lastrea spinulosa*, forming large tussocks, and is a striking object there.—J. COSMO MELVILL. *M. cærulea* Moench var. *robusta* Prah, Krit. Fl. Schles.-Holstein, ii. 257 (1890).—E. HACKEL.

GLYCERIA FESTUCÆFORMIS Heynhold. Sea-shore, Marlpit Bay,

Strangford Lough, Co. Down, July, 1904. See Journ. Bot., 1903, p. 353. The plants sent are not so luxuriant as have been found on other parts of the coast. I found much difficulty in separating small forms from *G. maritima*, in company with which it grows.—C. H. WADDELL. This gathering appeared to be a mixed one, and Prof. Hackel writes of the specimens submitted to him, "*Atropis maritima* Griseb., a somewhat robust form."—J. G.

FESTUCA PSEUDO-LOLIACEA Hackel. Aberdare, Glamorgan, June, 1902. The old records for this plant and its allies are not at all satisfactory. But Prof. Hackel tells me that we have here both *F. pratensis* Huds. and *F. pseudo-loliacea* Hackel, and *forma* (of the latter) *superpratensis* Hack. Mon. Fest. 162. The last-named is simply a form of *F. pseudo-loliacea* with the lower part of the panicle more or less branched. As two stems growing from the same root not seldom show, in the one case "the type," in the other "the form," it is clearly a point for description rather than for naming.—H. J. RIDDELSDELL.

BIBLIOGRAPHICAL NOTES.

XXXVI. — "SOLANDER'S JOURNAL."

THE remarks on p. 279 of last year's Journal referring to a journal supposed to have been kept by Solander have attracted attention in Australia, and Mr. Maiden sends me the full report of Mr. Fletcher's remarks at the meeting of the Linnean Society of New South Wales on May 31st, 1905, on a summary of which my comment was based. They run as follows:—

"Mr. Fletcher pointed out that Mr. Maiden's exhibit of the Banksian plants suggested a matter of more than sentimental interest to Australian naturalists which needed ventilation, namely, the whereabouts of Dr. Solander's Journal, and the prospects of its publication as a companion volume to Admiral Wharton's *Captain Cook's Journal* (1893), and Sir Joseph Hooker's *Journal of the Right Hon. Sir Joseph Banks* (1896). It was not generally known perhaps that Solander kept a Journal, as very few published references to it can be found. The speaker had met with only two. In his preface to *Cook's Journal*, Admiral Wharton refers to it under the impression that Hawkesworth had actually made use of it in drawing up his well-known compilation. But neither Hawkesworth's preface, nor a comparison of Hooker's 'Banks' with Hawkesworth's 'Cook,' lends any countenance to this view. On the other hand, Captain P. P. King seems to be the only author who has had anything definite to say about the Journal, and this apparently from personal knowledge. In his remarks upon Sting-ray Bay as the earlier name of Botany Bay, Captain King says—'it is so called in the charts of the "Endeavour's" voyage,

in the Hydrographical Office at the Admiralty, as well as in Sir Joseph Banks's copy of the "Endeavour's" journal, and in Dr. Solander's MS. journal, both of which are in the possession of my friend Robert Brown, Esq.* The subsequent fate of the Journal seems to be a matter of unpublished history. If the supposition be not altogether groundless, that when the 'Endeavour' was in harbour, and there was a prospect of botanizing, Banks left the record of zoological and anatomical details to Solander for the most part, one can understand Sir Joseph's brief mention of certain topics, such as the characteristics of the kangaroo, concerning which his Journal might otherwise have been expected to be more explicit. . . . It seems hardly credible that Solander's Journal would reveal nothing upon these and other interesting points. Therefore the expectation that its publication would supply a valuable complementary volume to Hooker's 'Banks' appeared to be not altogether a vain one. It was to be hoped that some effort might be made to rescue it from oblivion and to make it accessible to those who would gladly welcome its publication—or even the portion of it which relates to Australia."—(Proc. Linn. Soc. N.S. Wales, 1905, 233).

Captain King's statement is, as Mr. Fletcher says "definite," and it seems difficult to see how he could have been mistaken. Nevertheless I think it is pretty certain that he *was* mistaken. Admiral Wharton's reference to Solander is purely incidental, and may, I think, be dismissed. Mr. Fletcher shows that none of those who might have been expected to mention such a journal make any reference to it; had it existed, it might have been expected to be found in the Natural History Museum, where the collections and MSS. relating to the voyage are preserved. Mr. Carruthers, who inherited the Brown-Bennett traditions, never heard of it; and, as it would not form part of Banks's MSS., it would not have gone with them into the possession of Lord Brabourne; had it done so, it would have shared their fate.

So far as the kangaroo is concerned, Mr. Fletcher's suggestion and objection are met by the fact that the Zoological MSS. (usually called the "Solander MSS." but by no means entirely his work, Banks, Dryander, and others being represented therein) include a long description in Latin by Solander of the "Kanguru," drawn up, I am inclined to think, on the spot. In these MSS. Solander writes in Latin and in Swedish, rarely in English.

I think we must conclude in the absence of any further evidence that Solander kept no journal; or at least that, if he did, it has not been preserved.

JAMES BRITTEN.

* King's *Narrative of a Survey of the Intertropical, &c., Coasts of Australia*, vol. ii. p. 9 (1827).

SHORT NOTES.

TETRAPLODON WORMSKIOLDII IN SCOTLAND.—During a visit to Killin, Perthshire, in July last year, I received a small packet of mosses from Mr. D. A. Haggart, of Killin, which he had recently gathered. Among them I found a fine specimen of *Tetraplodon Wormskioldii* Lindb., which Mr. Haggart found on peat below Craig Cailleach, near Killin. This is, I believe, the first time this moss has been noticed in Britain since its first discovery by Messrs. Horrell and Jones in Teesdale, Durham, in 1901. My determination has been confirmed by Mr. D. A. Jones, of Harlech.—E. CLEMINSHAW.

RUBUS BRACTEATUS Bagnall.—The range of this beautiful bramble is becoming better known. In August last I gathered it in an open glade towards Colgate, St. Leonard's Forest, West Sussex; and on my return to Bristol I found the plant on Rodway Hill, one of the few remaining bits of the once Royal Forest of Kingswood, West Gloucester—an ancient demesne of our Saxon Kings. Mr. Bagnall was pleased to see these specimens so fresh and green as compared with the grimy bushes of his own Black Country.—J. W. WHITE.

ESSEX AND SUFFOLK PLANTS.—The following plants were observed by me when staying near Sudbury in August last:—

NORTH ESSEX:—*Castalia speciosa* Salisb., Gosfield Lake; not given in *Top. Bot.* for Essex N. *Ranunculus peltatus* Fr., Gosfield. *Acer campestre* L., very common, and sometimes large trees; occasionally as var. *leiocarpum* Wallr. as near Twinstead. *Rosa systyla* Bast., Twinstead. *Crataegus oxyacanthoides* Thuill., Twinstead. *C. Oxyacantha* × *oxyacanthoides*, Twinstead. *Ceratophyllum demersum* L., Gosfield. *Dipsacus pilosus* L., near Sudbury, but in Essex. *Picris hieracioides* L., near Maplestead. *Vinca minor* L., near Twinstead, looking native. *Mentha piperita* L. var. *officinalis*, near Little Maplestead, apparently native. *M. rubra* Sm., in the parish of Little Maplestead, native. *Quercus Robur* L. and *Q. sessiliflora* Salisb., woods near Twinstead, as native as in most counties. *Populus nigra* L., Twinstead.

WEST SUFFOLK:—*Diplotaxis muralis* DC., Sudbury, Newmarket. *Arenaria leptoclados* Guss., Long Melford. *Acer campestre* L. var. *leiocarpon* Wallr., Long Melford. *Rubus Radula* W. & N., Lavenham. *Ænanthe Phellandrium* Lam., Sudbury. *Calamintha Nepeta* Moench, between Sudbury and Lavenham; this is queried in *Top. Bot.* *Mentha spicata* L. (*M. viridis* L.), between Sudbury and Lavenham. *M. rubra* Sm., near Lavenham, native. *M. paludosa* Sole, Long Melford. *Callitriche stagnalis* Scop., Sudbury. *Poa subcærulea* Sm., Long Melford. *Glyceria plicata* Fr., Sudbury. *Festuca rubra* L., Lavenham.—G. CLARIDGE DRUCE.

NOTICES OF BOOKS.

New Creations in Plant Life: an authoritative account of the life and work of Luther Burbank. By W. S. HARWOOD. Pp. 358; forty-nine illustrations and portrait. New York and London: Macmillan & Co. 1905.

"Save me from my friends"! may well exclaim the subject of this fulsome biography. In the very title the word "creations" is somewhat presumptuous, where a more modest writer would have been satisfied with *innovations* or *improvements*. Where the author's vocabulary of adulation has tended to fall short in details, he comforts himself (and his readers?) that the subject of his devoted study "has never shrunk from giving still more of his strength to the illumination of obscure points"; and characterizes this as evidence of his "superb thoughtfulness," even when "care sought out the strings of his nerves to play sharp discords upon them."

In turning from one point to another in these pages, one is impressed with the exploitation of the business methods of a Yankee nurseryman, as specialized in the patent Californian brand, to the extent of wondering how far the pyrotechnics of the "yellow" press have fizzled among the products of modern American literature. The subject of this book is Luther Burbank; and this is what the *News* of New Jersey says of him:—"Luther Burbank—until recently an unknown name—has bestowed upon the world a greater increment of values, in things done and things inevitable, which are for the permanent betterment of civilization, than any score of celebrities in this decade or in any previous decade or century." After this perorative comparison of values, the humble remarks of a plain reviewer must fall flat. After this, "Is it too much to say that among the great benefactors of their race Luther Burbank will be unique in the splendor of his monument? That can never crumble while sunshine, air, and soil carry on their chemistry." One is almost inclined to hope that these elemental entities will, in awe and wonder, cease for a brief space to "carry on," and that in the lucid interval something may happen. We should like some further evidence of the assertion (on p. 363) that Prof. Hugo de Vries, the Dutch botanist, said of Mr. Burbank at a banquet (!): "The flowers and fruits of California are less wonderful than the flowers and fruits which Mr. Burbank has made." If such could be the case, the flora of California must be poor indeed. But the apotheosis of Mr. Burbank proceeds apace. The average so-called scientific man is merely the photographer, the recorder, while "Mr. Burbank and every other man along down the long line of noble descent, the clans of Darwin and Spencer, and Huxley and Tyndall,—is the painter, the creator!" In this select and exclusive quinquivirate no other American has a look in.

Here is a story of prune-culture from the book which will please tariff reformers (p. 122). The French prune-packers, it is said, often import Californian prunes, "manipulate" them with their own method of treatment, re-pack them, pay the American duty,

and send them back in large quantities to the United States as prime French prunes. We are quite sure that, from the respected position which Mr. Burbank holds among the Californian industrial magnates, he is no sympathizer with this form of pious fraud.

The illustrations to the volume are as redolent of inflated importance as the text, though as pictures many of them are interesting and clearly drawn. The frontispiece is the "improved amaryllis, with blossoms nearly a foot across." That it is an improvement, that the dainty amaryllis of the South African veldt should be transformed by the coddling wizardry of Californian glass into such monstrosities as are here figured, would probably even astonish the companions of the famous weaver in *A Midsummer Night's Dream*. Another illustration crudely advertises "thousands of dollars'-worth of seeds and bulbs in the packing-room." Facing p. 309 is a picture which shows, "Cultivating the mammoth pie-plant; Mr. Burbank is the central figure" (characteristic position throughout the text also). Again, another illustration facing p. 277 purports "showing method of grafting," which it scarcely does with clearness, as full half the picture is occupied by an ill-fitting pair of trousers. Mr. Burbank is evidently bored with a heavy correspondence; for persistent inquirers have been circularized with printed slips, in which they are informed that "if a reply is desired which requires more space than a postal card affords, always inclose five dollars." Possibly the heavy contributions to the morning mail may account for the not particularly useful piece of information that "sometimes the midday meal is eaten at one o'clock, sometimes not until three or four in the afternoon"; but further on, "if he has been compelled to lie late in the morning, frequently but two meals a day are eaten," though why suppress the alternative explanations of this apparent laxness?

Further comment on this book would be trifling. Mr. Burbank is probably an astute nurseryman, who has been commercially successful in business, and has heaped up dollars; and he would have been better advised had he not countenanced the effusive display of hyperbole his biographer has indulged in in narrating "all the marvelous acts he has accomplished in the ennoblement of the earth."

FREDERIC N. WILLIAMS.

Notes on the Life History of British Flowering Plants. By the Right Hon. Lord AVEBURY, P.C., &c., &c., &c. London: Macmillan & Co. 1905. Pp. xxiii, 450. 15s. net.

THE object of this work, as the preface tells us, is to supplement existing floras by describing points of interest in the life-history of British plants, which, of necessity, manuals such as those of Sowerby, Bentham, Hooker, and Babington cannot supply. Such points are the structure and equipment of the flower, the arrangement and character of leaves, the construction and appendages of the stem, fruit, and seed—everything, in fact, which has to play its part in the struggle for existence; as, also, the habits of the plant itself, and, in particular, its relations

with birds, beasts, and insects, its method of securing fertilization, its nocturnal, even, in some cases, its diurnal slumbers, or its constant wakefulness, its habitats, its longevity (as annual, biennial, or perennial). Having, in an introductory chapter, discussed the significance of all these features, Lord Avebury then proceeds to go through the British Flora, following the arrangement of Bentham's well-known *Handbook*, describing in some detail the characteristics which each plant exhibits, and adding explanations as to how these may be supposed to have been produced and preserved by Natural Selection, on account of some benefit which they ensure to their possessor.

The book should thus be exceedingly useful to young botanists of the newer and more interesting school, who, not content with identifying and cataloguing species, "like postage-stamps," endeavour to learn something more about the laws which govern plant-life, and in some measure to extend our knowledge of plant-history. How far our efforts have achieved any solid advance in this direction is another question, and as we turn over Lord Avebury's pages we are more and more impressed with the truth of his own observation in another work, that those who know most, either of zoology or botany, are least inclined to fancy that we know much.

To take a few examples which at once suggest themselves, the Sweet Flag (*Acorus Calamus*), though flowering abundantly, never produces ripe seed in Europe, though it does in Asia (p. 392). Why, then, does it persevere in a process so exhausting as that of blooming, from which it derives no practical benefit? It is suggested that the failure to fructify is due to the want of insects capable of fertilizing it,—which, however, does not answer the question. Ludwig accounts for the phenomenon by suggesting that all our European plants are descended from a specimen brought from the East by Clusius. Bentham, on the other hand, regards it as native in some of our eastern counties.* Evidently we are very far from having fathomed a problem which lies at the very root of vegetable life. The same problem is likewise suggested by the Lime-tree (p. 121). This not only flowers profusely, but employs every art of scent and structure to attract insect visitors, and to secure, by means of them, the supreme benefit of cross-fertilization. Yet the result, at least with us, is practically *nil*,—"The Lime scarcely ever ripens seeds in our country." Yet here is surely an instance in which Natural Selection might be expected to work at high pressure. The trees which deny themselves the unprofitable pomp of blossom should have more force to expend on more practical purposes, and should accordingly outstrip their more showy brethren. Another interesting question, not noticed by Lord Avebury, is the mortality amongst humble bees which visit the blossoms, of which scores are always to be found dead beneath a tree in flower. We must add that there is some ambiguity of language here, which might lead the incautious reader to suppose that the Lime-tree with which we

* [But see Journ. Bot., 1871, 163.—ED. JOURN. BOT.]

are all familiar is *Tilia parvifolia*, the only species certainly indigenous, which it is not. In explanation of the resemblance of the fruiting head of the Strawberry Clover to the fruit after which it is named, it is suggested (p. 163) that this may sometimes lead to its being gathered by mistake and carried for some distance before the error is detected, thus aiding the dispersal of the seed,—a possibility which does not seem to come within the range of practical economics. In regard of foliage, of what advantage can it be to such a plant as *Lathyrus Nissolia*, when growing amidst herbage, to simulate in its leaves the grass about it? (p. 173.) This would seem only the more certainly to cause its being eaten by cattle. On the other hand, if *Dentaria* (Coral-root) grows, as we are told (p. 80), in damp woods, why should it be in any danger from browsing quadrupeds? And can it seriously be supposed that the resemblance of the Bee Orchis (p. 408) to a bee can be explained by its frightening off either quadrupeds or insects?

Such are a few instances that may serve to show how easy it is to find some sort of reason to explain the facts of nature, and how hard to find one that will really hold water.

In some cases we are unable to agree with Lord Avebury's facts. Thus, we had thought that the old idea concerning the prickles of holly-leaves disappearing when they reach a height where cattle cannot get at them had been finally disposed of. Our author also speaks (p. 281) as if the spines on the upper branches are "lost." It is not a question of losing them, but of never acquiring. Even on the lower branches young leaves frequently have none. Again, in another line, the derivation of "Foxglove" from "Folksglove" has surely been disproved.

The illustrations are generally good—we cannot admire that of *Geranium Robertianum* (p. 128)—but will mostly be already familiar to those who know other works of his lordship. There is a useful glossary.

JOHN GERARD.

Research Methods in Ecology. By F. E. CLEMENTS, Ph.D., Associate Professor of Plant Physiology in the University of Nebraska. 8vo, pp. xvii, 334, tt. 85. Lincoln, Nebraska: University Publishing Co. 1905.

THE present volume, Dr. Clements tells us, is intended as a handbook for investigators and for advanced students of ecology (it does not seem possible to insist on a stricter following of etymology and to write 'œcology'). It is not a text-book of the subject—the author has in preparation an elementary text-book, covering the same field, but adapted to the needs of undergraduate students—but is essentially an account of the methods used by the author in his studies of the last eight years, during which "a serious attempt has been made to discover and to correlate the fundamental points of view in the vast field of vegetation."

It is a praiseworthy effort to bring precision into the study of an aspect of botany which, the author rightly considers, was in danger of being spoiled through the zeal of untrained workers

and the superficialities of the mere dabbler. Serious ecologists will welcome Dr. Clements' work as a fundamental one—a basis from which unlimited development becomes possible, while botanists whose work lies in other directions will be glad of the opportunity of becoming acquainted with the present position of an important phase of their subject, and will condone the occasional tone of exaggeration or depreciation noticeable in the introductory chapter.

This first chapter, entitled the Foundation of Ecology, is devoted mainly to discussing the need of a system and its applications. The need of a precise system, if any real progress is to be made, is evident; the applications of ecology are far-reaching. As the author points out, forestry is the ecology of a particular kind of vegetation, the forest. A full knowledge of the character and laws of succession will be of the greatest value to the forester in all studies of forestation and reforestation; the means of determining the physical nature of the habitat is also an important aid, especially in the case of forest plantings in non-forested areas.

Experimental evolution—or that phase of experimental ecology which has to do with the plant—will be a most fertile and important field. “Attention will be directed first to those forms which are undergoing modification at the present time. The cause and direction of change will be ascertained, and its amount and rapidity measured by biometrical methods. The next step will be to actually change the habitat of representative types, and to determine for each the general trend of adaptation as well as the exact details. By means of the methods used and the results obtained in these investigations, it will be possible to attack the much more difficult problem of retracing the development of species already definitely constituted.” By the experimental method it will be possible to distinguish between constant and highly plastic groups, and between forms which grew in nature in various habitats without suffering material change, and those (termed *ecads*) which are modified to constitute a new form in each habitat.

It is obvious that the methods of ecology may be a great help to the taxonomist in his concept of the species, but they touch only the bare fringe of his subject. As a perusal of the present volume shows, it is with the vegetative characters that such methods are almost exclusively concerned, those which, being primarily associated with the maintenance of the individual, necessarily respond more readily to changes in environment. We fear that the day is far distant when experimental ecology will reach the more deeply-seated characters of flower and seed which taxonomists from Ray, Jussieu, and De Candolle onwards have regarded as of primary importance. The work of the true taxonomist only begins with the species, which he recognizes in many cases as unsatisfactory and unscientific, but as necessary for labelling purposes and reference, and Dr. Clements's statement that “the more intensive the study, the greater the output in species,” is by no means generally true. Doubtless he is thinking of brambles, hawkweeds, and *Crataegus*—groups which should afford

excellent subject for experimental ecology. But on the other hand a more careful study often results in a very great reduction in the number of recognized species—forms which, when studied as items in one particular flora, seemed quite distinct, are found to be merely parts of a larger whole (ecads, in fact) when studied more intimately in relation to the larger groups. It is the difference between working at a flora and monographing a genus, a difference which most taxonomists would recognize. Again, it is of great advantage to know something of the flora of a hitherto little known district, and much valuable information has been gained in taxonomy and geographical distribution by a study in the herbarium of dried plants, which, however much he may regret the absence of the living plant and its natural surroundings, must be the chief source of material for the taxonomist's study. We have ventured these remarks owing to the somewhat restricted view of taxonomy, and the somewhat exaggerated view on species-making, which the author seems to hold.

Dr. Clements treats of his subject under three headings,—the habitat, the plant, and the formation. Under the first he gives a full account of instruments and methods available for determining the water-content of the soil, the humidity of the air, and factors of light, temperature, precipitation, wind, structure of soil, conformation of locality, and biotic factors. Under the plant are discussed its relations to the direct stimuli of water and light, hydroharmose and photoharmose respectively, and this is followed by a section on experimental evolution and its methods. The last chapter, 'the formation,' deals with methods of investigation and record, the accurate and detailed mapping of areas, the use of photography, and the formation of herbarium records. The section entitled the development of the formation supplies a useful and well-arranged account of the operation of the various factors associated with its development, alteration by invasion, and succession.

At the end of the book is a long glossary of new terms which the author considers necessary to give precision to the subject. While many will doubtless be helpful, others will appear in the light of a new terror to the botanist who amid multifarious duties would gladly follow the development of this new branch of his subject. Some, such as *driodad*, a dry thicket plant, have a helpful mnemonic form; but even a knowledge of Greek will hardly suggest the meaning of *creatospore* (a plant with nut-fruits), and to fall back on such homely words as *abundance*, *copious* and others, suggests a lack of inventive power.

A. B. RENDLE.

BOOK-NOTES, NEWS, &c.

DR. RENDLE has been appointed Keeper of the Department of Botany in the British Museum (Natural History).

At the meeting of the Linnean Society on 21st December, 1905, Mr. Charles T. Drury, F.L.S., exhibited an aposporous seedling of *Polypodium vulgare*, with a frond bearing a well-defined prothallus at the tip. The species being impatient of close culture, renders it

difficult to treat it successfully under glass. He also showed a new case of apospory in *Cystopteris montana*, presenting the following novel features:—(1) Apospory appears upon an otherwise normal plant; (2) entire fronds of abnormally small size are characterized by the aposporous diaphanous tissue, which is usually confined to the apices of the fronds; (3) by simply layering these have, without development of root-hairs, produced prothalli; (4) in July last this usually deciduous fern produced six minute pinnatifid fronds at the base of a normal frond, which persisted, and produced young plants from apogamic buds. Dr. A. B. Rendle gave a report of the recent Vienna Congress, at which he was the Society's delegate. We hope to publish later a paper on the subject from his pen. A paper by Dr. Franz Kränzlin, entitled "*Cyrtandrea Malayæ insularis novæ*," and founded on specimens in the Herbarium of the Royal Botanic Gardens, Kew; and another by Messrs. H. and J. Groves, "*On Characeæ from the Cape of Good Hope collected by Major A. H. Wolley-Dod*," were also communicated.

WE have received the first number of *The Garden Album and Review*, a new illustrated monthly magazine of horticulture published by Messrs. Simpkin and Marshall, and edited by Mr. John Weathers. It is extraordinarily cheap, containing four well-executed and well-coloured plates and sixteen pages of letterpress, with illustrations, at the cost of sevenpence net. The interest appealed to is, of course, mainly horticultural, but the cheapness of the book will probably secure it subscribers amongst those who like pretty pictures at small cost, and it certainly deserves encouragement.

OUR readers will have heard with regret of the death, in his eighty-second year, of Mr. FREDERICK TOWNSEND, who has so long held a prominent place among British botanists of the critical school. We hope to publish a memoir of him in an early issue.

THE recent death of Sir MOUNTSTUART ELPHINSTONE GRANT DUFF (who was born in 1829) has removed from us a man of almost universal culture, and one who, though not strictly speaking a botanist, demands a line or two of record in this Journal. His reputation will rest upon his work as a politician and *littérateur*; his most permanent record will remain in the numerous volumes of *Notes from a Diary*, the instalments of which for so many years have delighted the general reader, and have aptly illustrated the proverb, *noscitur a sociis*. The notes abound in allusions to botanists and plants; some of the former we extracted in this Journal for 1904, pp. 294–300. Sir Grant Duff was in intimate relations with Sir Joseph Hooker and Sir William Thiselton-Dyer, but his chief friend and mentor in botany was the late Lord De Tabley, to whose posthumous *Flora of Cheshire* he contributed a charming biographical notice; his memoir of De Tabley, which appeared in the *Spectator* shortly after his death, is quoted in this Journal for 1896, p. 77.

THE *Journal of the Kew Guild* for 1905 contains a notice of the late Charles Moore (with portrait) by his nephew, Mr. F. W. Moore,

of Glasnevin, which supplements the short account given in last year's Journal (p. 280). There is also a notice, with portrait, of John Horne (see Journ. Bot. 1905, 192). The Kew Journal reprints from the *Pall Mall Gazette* an article on the wages agitation at Kew last year, which resulted in the dismissal by the late Director and subsequent reinstatement of two of the gardeners—a matter which is commented on at some length in the *Government Workers' Advocate* for December and January last; the latter issue contains a portrait of the late Director in his uniform as "Inspector of Constables."

FREDERICK WILLIAM BURBIDGE, who died at Dublin on Dec. 24, was born at Wymeswold, Leicestershire, where his father was a farmer and fruit-grower, on March 21, 1847. From the Horticultural Society's Garden at Chiswick he went to Kew, where, in addition to his work in the gardens, his skill as a draughtsman led to his employment in the herbarium, where he made a series of drawings for the collection there. In 1873, having left Kew, he published a useful little shilling handbook on *The Art of Botanical Drawing*; the plates in his important book on *The Narcissus* (1875) were drawn by him. In 1877 Burbidge published, through Messrs. Blackwood, a volume on *Cultivated Plants, their Propagation and Treatment*, in which practical knowledge is combined with scientific aspects in a manner too seldom found in books of the kind; it is well written and exceedingly interesting, and should, as Sir Joseph Hooker has said, be in every gardener's library. In this year he went to Borneo and the Sulu Archipelago, to collect for Messrs. Veitch; here he made many discoveries of interest, among them being the beautiful Scitamineous plant named *Burbidgea* by Sir Joseph Hooker, and a new pitcher-plant, *Nepenthes Burbidgei* Hook. f.; the sketches of plants made during the expedition are in the library attached to the National Herbarium. He published an account of his journey in a volume entitled *The Gardens of the Sun*. In 1879 Burbidge was appointed Curator of the Trinity College Botanic Gardens, Dublin—a post which he retained till his death; his important work in this position obtained for him the honorary degree of Master of Arts of the Dublin University. An interesting paper on the hybrid *Senecio albescens*, in which he collaborated with Mr. Nathaniel Colgan, will be found in this Journal for 1902, pp. 401–406.

THE Kew *Bulletin* has made a fresh start! Ignoring the past, and leaving the volume for 1901 still incomplete, it begins *de novo* with "No. 1. 1905 (*sic*)."
The Stationery Office date is January, 1906, but dating has always been a matter in which the *Bulletin* has been a law to itself. The present number, of eight pages, is devoted to a "select list of works prepared at the Royal Botanic Gardens, Kew, by members of the staff or in collaboration with it." We do not understand what principle has governed the "selection" of works; and we are sorry that the opportunity has not been taken to give some information as to the authorship of the various "hand-lists" of plants cultivated in the Gardens.

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No. 519

MARCH, 1906

Vol. XLIV

THE
JOURNAL OF BOTANY
BRITISH AND FOREIGN

EDITED BY
JAMES BRITTEN, K.S.G., F.L.S.

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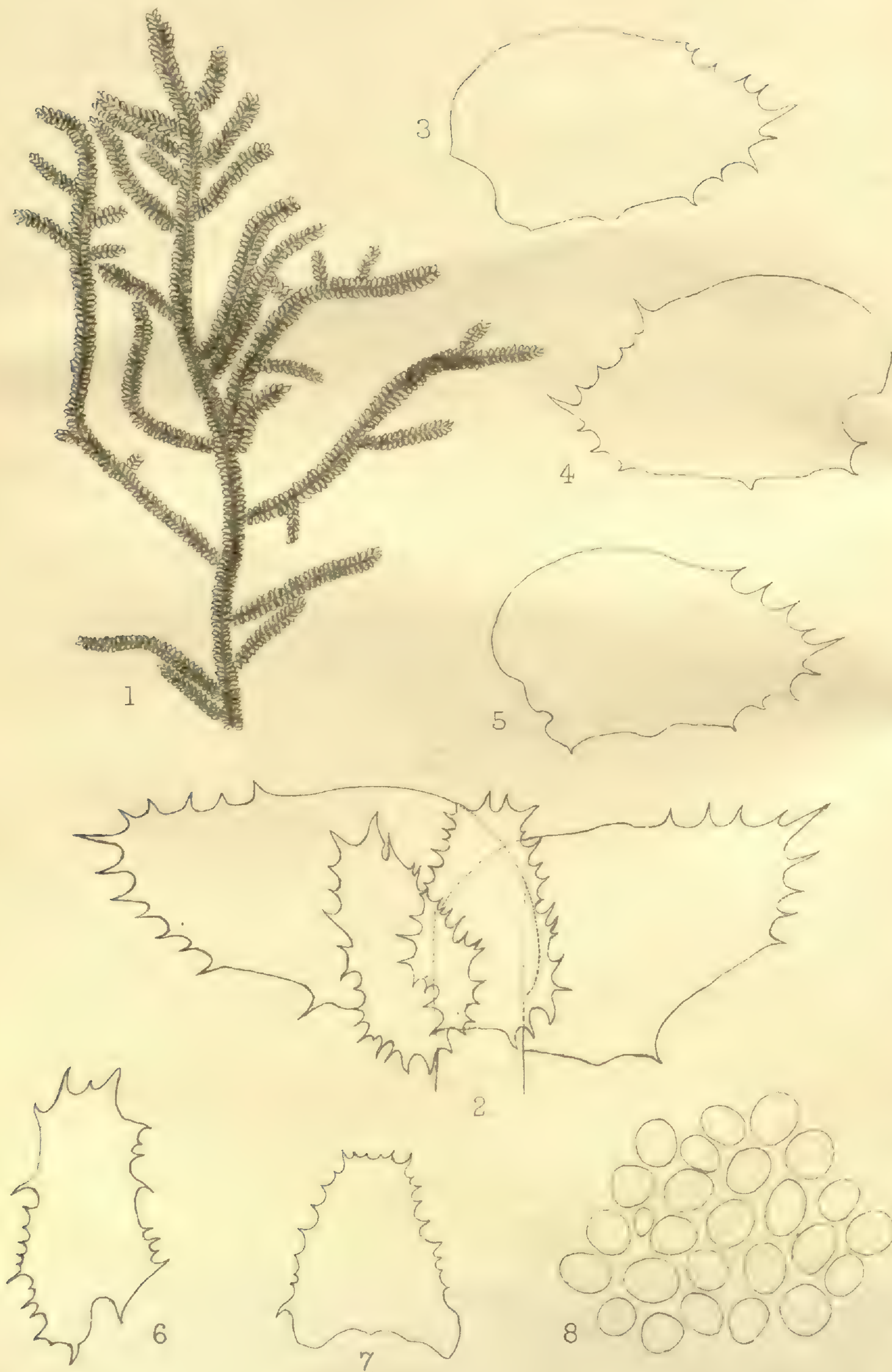
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Porella laevigata var. *killarniensis* Pears.

PORELLA LÆVIGATA LINDB. var. nov. KILLARNIENSIS.

By W. H. PEARSON.

(PLATE 477.)

Loosely cæspitose, very large, pale yellowish green above, ochraceous below. Stems graceful, irregularly bipinnate, on a cross-section 12×20 cells, cortical 1 or 2 layers, small, thick-walled, light brown, inner hyaline. Leaves plane, antical lobes ovate, acute, margin of apical portion spinulose-dentate; postical lobes and stipules margin spinulose-dentate or denticulate; texture delicate; cuticle polished; cells smallish, roundish; walls thick; trigones indistinct or none; acrid taste. Dimensions: Stems 3–5 in. long, .5 mm. diam., with leaves 3 mm.; branches 1–2 in. long; leaves, antical lobes $1.75 \text{ mm.} \times 1 \text{ mm.}$, $1.5 \text{ mm.} \times .75 \text{ mm.}$, $1.5 \text{ mm.} \times .85 \text{ mm.}$; postical lobes $1 \text{ mm.} \times .6 \text{ mm.}$, $1 \text{ mm.} \times .5 \text{ mm.}$; cells .025 mm.; stipules $1 \text{ mm.} \times .75 \text{ mm.}$, $.8 \text{ mm.} \times .6 \text{ mm.}$, wide at the base.

Hab. Muckross, *Stewart & Holt*, June, 1885. On precipitous rocks, Torc Wood, near the waterfall, Killarney, Ireland, *W. H. Pearson*, June, 1905.

Porella lævigata is the most variable of the species belonging to this genus amongst the few found in Europe, and, as the tendency of modern students of the *Hepaticæ* is to define forms of particular species, it affords good material for such research, as at least four distinct forms can be separated, yet all belonging undoubtedly to the specific type.

In June, 1905, I collected, at Killarney, a *Porella* which much interested me, and since then I have been studying the genus again, and venture to publish these notes. Mr. Macvicar and Mr. George Stabler have generously given me the opportunity of examining their specimens of *P. lævigata*, and I have also examined those in the Manchester Museum, which contains the collections of the late Dr. Carrington and Mr. G. A. Holt. The salient characters are the polished cuticle, the supposed acute antical lobes, the spinulose-dentate margins of the postical lobes and stipules, and a very peculiar character, first noticed, I believe, by the late Prof. S. O. Lindberg, *viz.* the acrid taste. In what is probably the type of the species the antical lobes are acute, with a few teeth (two or three) near the apex, as figured by Hooker (*Brit. Jung.* pl. xxxv. fig. 3 (1813)), copied by Ekart (*Syn. Jung. Germ.* tab. vi. fig. 3 (1834)), and again by Hahn (*Lebermoose Deutschlands*, tab. ix. fig. 65 b (1885)). Belonging to this form in Mr. Macvicar's collection are specimens collected by Dr. E. Levier, Vallombrosa, September, 1884; by F. Aug. Artoria, Prov. de Côte, Straralle près Tarno, April, 1889; G. & R., *Hep. Eur.* n. 259, Stärali, Scandinavia, leg. Lindberg; in Mr. Stabler's collection, specimens collected at Barmouth Junction, North Wales, May, 1883; and on a wall, Windermere, April, 1869, by himself; in the Manchester Museum, *Crimea ex herb. Lindb.* (K. 3009) (here the antical lobes are acute, apicu-

late, uncinatè, entire, or with rarely one or two teeth; postical lobes and stipules dentate, approaching var. *acuta*); Vosges, ex herb. Austin (20413), a robust form, leaves remarkably involute, brownish colour, antical lobes acute, subdentate; postical lobes often coarsely laciniatè; approaches var. *killarniensis*.

A much commoner variety is one with the antical lobes acute, often apiculate, uncinatè, margin entire; this I call var. *acuta*. Belonging to it are Massalongo, Hep. Ital. Venet., exsicc. n. 65; North America, leg. Wright (H. 2030); Carr. & Pears., Hep. Brit. exsicc. n. 45, Tyn-y-Groes, North Wales, May, 1877, W. H. P.; n. 274, base of trees, Seatoller, Cumberland, July, 1890, Carrington & Pears.; n. 275, in wood near Loch Maree, Scotland, Dr. Carrington, September, 1889; G. & R., Hep. Eur. n. 53; Asturia, leg. Durieu, 1835 (H. 2030), antical lobes with rarely one or two teeth, approaching the type; St. Paudelon, Pyrenees, leg. Spruce.

Another variety is var. *subintegra* Kaalaas (Nyt. Mag. f. Naturv. xl. p. 244 (1902)), with margin entire, rarely with an acute apex. I do not know how this agrees with var. *integra* (Dill.) Lindberg, Moore in Proc. Roy. Irish Acad. ser. ii. ii. 618 (1876), as description or specimens I have not seen; in this one the antical lobes are shorter and broader, with the apex obtuse, margin entire; postical lobes and stipules with margins entire or very slightly dentate. This variety approaches *Porella Thuja* Dicks. in its rounder antical lobes, and the almost entire margins of the postical lobes and stipules. It is found with us, and I hope to be able to communicate a further note on it later on.

The third variety, *killarniensis*, if not worthy of ranking as a distinct species,* is an extreme form of the one I consider as typical; it is a very fine variety, some of the stems being from four to five inches long, but its characters do not arise from its luxuriance, for an equally large form of *P. lævigata* from Yewbarrow, collected by Mr. Stabler, has none of them. From the type it differs in being much lighter in colour, pale green near the apex, and light ochraceous below. When dry *P. lævigata* has its leaves usually involute; in this variety the leaves usually remain plane, some of the upper leaves are even reflexed. In habit it is much more graceful than the type, which usually grows in closely matted imbricate patches. On the contrary, var. *killarniensis* grows in graceful loose tufts; the antical lobes of the leaves are longer proportionately than in the type, and are for half their margin towards their apices spinulose-dentate; the postical lobes and stipules are the same or denticulate. The texture of the plant is more delicate than in the type. Its polished cuticle and acrid taste clearly refer it to *P. lævigata*, but whether future discoveries of the male and fertile plants will reveal other characters removing it from the type remains to be seen.

Prof. Dr. Victor Schiffner, to whom I have sent a set of specimens for his Hep. Eur. Exsiccatae, says it is a lax form of, but not differing morphologically from, *lævigata*.

* It is so given in Mr. Macvicar's *Census Catalogue*, p. 21.

Dr. B. Kaalaas writes: "Your var. *killarniensis* is quite different from all forms we have of this species in Norway." I find Messrs. Stewart & Holt collected it in June, 1885, at Muckcross, and it is probably the plant referred to by the late Dr. Carrington in his *Irish Cryptogams* as a very fine form of *lævigata*, specimens of which I have not seen.

In my *Hepaticæ Brit. Isles* I describe the margins of the postical lobes and stipules of *P. lævigata* as ciliate-dentate, which more correctly should be described as spinulose-dentate.

I shall be pleased to send specimens of the var. *killarniensis* to students interested in it.

DESCRIPTION OF PLATE 477.—Fig. 1. Plant, natural size. 2. Portion of stem, postical view, $\times 31$. 3, 4, 5. Leaves, antical lobes, $\times 31$. 6. Postical lobe, $\times 31$. 7. Stipule, $\times 31$. 8. Portion of leaf, $\times 290$.

UGANDA GAMOPETALÆ FROM DR. BAGSHAWE.

BY SPENCER MOORE, B.Sc., F.L.S.

THE following are some of the novelties in a small collection made by Dr. A. G. Bagshawe at Entebbe in 1905, and recently received at the National Herbarium. A few of the more interesting plants which are not new are also mentioned.

Gardenia tigrina Welw. ex Hiern, Cat. Welw. Pl. i. 462. No. 781. Hitherto known only from Angola.

Randia naucleoides, sp. nov. Fruticosa ramulis validis crebro foliosis obscure puberulis in sicco olivaceis, foliis majusculis breviter petiolatis ovatis vel ovato-oblongis acutis obtusisve basi obtusis paullove rotundatis firme membranaceis utrinque costis puberulis vel pubescentibus exemptis glabris supra in sicco olivaceis subtus pallidioribus costis secundariis utrovis latere 9–11 marginem versus latissime arcuatis supra fere planis subtus prominentibus, stipulis ovatis obtusissimis vel obtusis diuscule persistentibus basi inter se connatis, floribus pro rata parvis sessilibus vel summum brevissime pedicellatis in glomerulum sphæroideum densum ad apicem ramulorum sessilem aggregatis, bracteis ovatis vel lanceolatis acutis vel acuminatis, calycis tubo (ovario) turbinato minute pubescente quam limbus campanulari-infundibuliformis 5-lobus glaber brevior lobis lanceolato-subulatis patulis limbo parum brevioribus, corollæ 5-meræ extus medio tubo minute pubescente exempto glabræ intus faucibus pilis luteis villosis tubo adusque medium cylindrico inde subito campanulato-dilatato lobis ovato-lanceolatis sursum attenuatis quam tubus brevioribus, antheris subsessilibus tubo insertis inclusis, ovario 2-loculari, stylo incluso glabro, stigmate anguste fusiformi apice obtuso longitrorsum sulcato, ovulis permultis, baccis parvis sphæroideis calyce coronatis pedicellis quam se ipsæ longioribus suffultis 2-locularibus.

Hab. Entebbe. No. 771. "Shrub with white flowers."

Folia modice 14·0–20·0 cm. long., 5·5–8·0 cm. lat.; petioli 0·6–1·0 cm. long., minute puberuli, fac. sup. canaliculati. Stipulae circa 1·0 cm. long., dorso medio pilosae, intus basi villosae. Florum glomeruli 2·5–3·0 cm. diam. Flores albi. Calycis tubus (ovarium) 0·3 cm. long.; limbus indivisus 0·4 cm., lobi 0·35 cm. long. Corolla humectata in toto 1·5 cm. long., tubi pars angusta 0·4 cm. pars dilatata 0·4 cm. long., haec 0·4 cm. illa 0·15–0·2 cm. diam.; lobi 0·7 cm. long. Antherae late oblongae, acutae, 0·225 cm. long. Stylus 0·5 cm., stigma 0·3 cm. long. Baccae siccae 0·9 cm. $\times$ 0·9 cm., adpresse pilosae, brunneae, harum pedicelli saepissime 1·5–2·0 cm. long. Semina subrotunda, circa 0·15 cm. long.

A remarkable plant, easily distinguished by its terminal, sessile, many-flowered glomerules, which give it the appearance of a *Nauclea*.

Tricalysia Bagshawei, sp. nov. Fruticosa, ramosa, ramulis crebro foliosis puberulis cortice subalbido obductis novellis pubescentibus, foliis mediocribus brevipetiolatis oblongo-lanceolatis apice cuspidatis obtusis basi cuneatim angustatis utrinque costa media pilosa exempta glabris supra in sicco brunneis parum nitentibus subtus viridioribus necnon pallidioribus, stipulis e basi lata extus griseo-pubescente in appendicem filiformem longam exeuntibus, cymis solemniter 4–5-floris breviter pedunculatis, calyculo unico ore truncata ut pedunculus et calyx breviter 6-dentatus griseo-pubescente, calycis tubo (ovario) cylindrico-turbinato quam limbus fere triplo brevior, corollae tubo quam calycis limbus circa triplo longiore sursum leviter ampliato intus piloso lobis 6 tubo paullo brevioribus ovato-oblongis obtusis dorso sericeo-pubescentibus margine passim ciliolatis, staminibus exsertis filamentis quam antherae brevioribus, stylo exserto glabro hujus ramis lineari-oblongis marginibus cito involutis, ovarii loculis 2-ovulatis.

Hab. Entebbe. No. 792. "Shrub with white flowers."

Folia 5·0–10·0 cm. long., 2·5–3·0 cm. lat.; costae secundariae utrinque 3–5, distantes, aperte arcuatae, pag. sup. plus minus obscurae, pag. inf. satis prominulae; petioli $\pm$ 0·5 cm. long., pubescentes. Stipularum basis 0·2 cm., appendix 0·4 cm. long. Cymarum axis 0·2–0·5 cm. long. Flores albi. Calyculus 0·15 cm., calycis tubus (ovarium) 0·1 cm., limbus in toto 0·275 cm. long., hujus dentes 0·04 cm. long. Corollae tubus 0·85 cm. long., ima basi 0·12 cm., faucibus 0·25 cm. diam.; lobi 0·65 cm. long. Filamenta inferne dilatata, circa 0·2 cm. long.; antherae 0·4 cm. long. Stylus 0·8 cm., ejus rami 0·3 cm. long.

Known by the few-nerved leaves, together with the single calyculus, the very short 6-toothed calyx, the long corolla-lobes, &c. This plant is also in the Kew Herbarium, the specimens sent from Entebbe by Mr. Mahon.

Psychotria (§ CONFERTIFLORÆ) maculata, sp. nov. Fruticosa ramulis crebro pilosis griseo-pubescentibus dein puberulis novellis complanatis, foliis majusculis petiolatis ellipticis apice obtusis raro obscure cuspidulatis basi longe attenuatis papyraceis in sicco griseo-viridibus subtus pallidioribus supra puberulis subtus praesertim in nervis pubescentibus ibique punctis (raro lineis brevibus) nigris

sparsis indutis costis secundariis utrinque 8-9 ascendentibus marginem versus late fornicatis, stipulis ovatis acutis vel acuminatis dorso pubescentibus basibus decoloribus diuscule persistentibus, floribus mediocribus in cymis lateralibus congestis ebracteatis plurifloris pedunculatis dispositis, pedunculis pedicellisque pubescentibus his calyci subæquilongis, calycis tubo (ovario) subglabro puberulo quam limbus dentatus paullo brevior, corollæ extus glabræ tubo intus annulatim villoso quam lobi oblongi obtusi longiore, antheris breviter exsertis, disco elevato, stylo corollæ tubum vix æquante glabro clavellato breviter bifido.

Hab. Entebbe. No. 694. "Shrub with white flowers."

Folia 12.0-18.0 cm. long., summum 4.5-7.0 cm. lat.; costæ delicatulæ, pag. sup. magis prominentes; petioli 1.5-2.5 cm. long., pubescentes subinde puberuli. Stipulæ circa 0.4 cm. long. Pedunculi circa 2.0 cm. long. Cymæ 1.0-1.5 cm. long. et lat. Pedicelli solemniter 0.2-0.25 cm. long. Flores ex schedis cl. detectoris albi. Ovarium 0.1 cm., calycis limbus 0.2 cm. long. Corollæ tubus 0.55 cm., limbi lobi ægre 0.3 cm. long. Stamina juxta medium tubum inserta; filamenta 0.25 cm., antheræ 0.1 cm. long. Stylus fere 0.5 cm. long., ejus lobi 0.06 cm. Fructus (anne profecto maturi?) sphæroidei, pilosuli, 0.4 cm. diam.

Nearest *P. nigropunctata* Hiern, but with much larger and differently-shaped leaves on longer petioles, different stipules and calyx, &c.

Senecio Vitalba, sp. nov. Caule volubili gracili tereti glabro pluristriato in sicco castaneo, foliis ovatis sursum cuspidato-attenuatis apice obtusiusculis basi late rotundatis margine denticulis paucis exemptis integris 5-nervibus papyraceis glabris in sicco castaneo-brunneis subtus pallidioribus summis maxime imminutis in bracteas transeuntibus petiolis gracilibus basi nequaquam auriculatis quam se ipsa brevioribus fultis, capitulis submediocribus discoideis heterogamis 12-flosculosis in paniculis racemiformibus axillaribus terminalibusve laxis gracilibus crebro bracteatis folia excedentibus subæquantibusve puberulis dispositis, pedunculis propriis involucrum sæpissime excedentibus, bracteis spathulato-linearibus acutis puberulis, involucri obovoidei phyllis 8 oblongis apice triangulari obtusis margine membranaceis minute puberulis additis perpaucis lanceolato-oblongis multo brevioribus calyculum conficientibus, flosculis 3-4 exterioribus femineis, flosculorum omnium corollis superne abrupte campanulatis, antheris basi breviter sagittatis, achæniis crudis cylindricis 5-costatis glabris, pappi setis scabriusculis albis.

Hab. Entebbe. No. 729.

Foliorum limbus solemniter 6.0-6.5 × 3.2-3.5 cm., juxta apicem modo 0.4 cm. lat., in sicco aliquantulum nitidus; petioli 2.5-3.5 cm. long., basi leviter incrassati. Paniculæ circa 8.0 cm. long., summæ equidem abbreviatæ necnon pauciuscephalæ. Pedunculi proprii solemniter 1.0-1.5 cm. long., tenuissimi, nudi vel bracteati. Bracteæ majores 0.5-0.8 cm., minimæ 0.15 cm. long. Involucra 0.5-0.6 cm. long., 0.5 cm. diam. Receptaculum foveolatum. Corollarum tubi pars angusta 0.45 cm. long.; fl. fem. pars campanulata

(lobis anguste oblongis inclusis) 0.2 cm. long., fl. hermaph. 0.35 cm. Styli rami fl. fem. crassiusculi 0.15 cm., fl. hermaph. graciliores 0.25 cm. long. Achænia 0.2 cm. pappus 0.75 cm. long.

Nearest *S. clematoides* Sch. Bip. and its allies, of which several have been described in recent years. From all it differs *inter alia* in leaf, the lax racemose panicles, and the involucre.

Sersalisia edulis, sp. nov. Arbor ramulis robustis crebro foliatis cortice rimoso rubescenti griseove obductis, foliis ad apicem ramulorum approximatis vel subdistantibus lamina quam petiolus abbreviatus multoties longiore oblanceolata obtusissima raro apice cuspidulata basin versus longe cuneatim angustata margine leviter undulata coriacea utrinque glabra costa media fac. inf. valde prominente costis secundariis utrinque 10–12 supra planis leviterve impressis subtus mediocriter eminentibus costis tertii ordinis difficile aspectabilibus, pedicellis ex axillis foliorum delapsorum vel adhuc sedentium acervatim oriundis ut calyces fulvo-pubescentibus, calycis subhemisphærici lobis late ovatis obtusis tubo æquilongis, corollæ usque medium divisæ tubo lobis æquilongo his ovato-oblongis obtusis patentibus, filamentis antheris oblongo-cordatis breviter apiculatis fere æquilongis, staminodiis 5 minutis, ovario ovoideo 5-loculari villosio stylo glabro se ipsum ter excedente coronato, ovulis prope basin loculi insertis, stigmatibus obscure lobatis, bacca eduli pro rata magna subsphæroidea rubra monosperma, seminibus exalbuminosis.

Hab. Entebbe. No. 774. "Common forest tree with white flowers and red edible fruits."

Folia modice 10.0–14.0 cm. long., 3.0–4.5 cm. lat., in sicco griseo-viridia; petioli summum 1.0 cm. long., crassiusculi. Pedunculi 0.4 cm. long. Flores albi. Calyx 0.3 × 0.275 cm. Corollæ tubus necnon lobi 0.25 cm. long. Filamenta 0.15 cm., antheræ fere 0.2 cm. long. Ovarium 0.15 cm., stylus 0.45 cm. long. Bacca 2.0–2.3 cm. long., 1.7 cm. diam., in sicco subnitens, Semina pulpo nidulantia, parum compressa, 1.7 cm. long.

Known at once by the long, shortly petioled, oblanceolate, very obtuse leaves, together with the large red edible fruits.

The genus *Sersalisia* has had a somewhat chequered history. Established by Robert Brown in 1810, it was kept up by De Candolle in the eighth volume of the *Prodromus*, and in the *Flora Australiensis* by Bentham. In the *Genera Plantarum* of Bentham & Hooker we, however, find its species placed partly in *Lucuma*, partly in *Sideroxylon*. On the other hand, Baillon, in his *Histoire des Plantes*, retains the genus, making it include other genera previously regarded as valid. Recently Engler, in his monograph of the African *Sapotaceæ*, has referred to *Sersalisia* a few African plants having the same characters as that here described, two of which Hiern, in the *Catalogue of Welwitsch's African Plants*, considers to be species of *Chrysophyllum*.

Mimusops (QUATERNARIA § INTEGRÆ) **Bagshawei**, sp. nov. Arbor ramulis crebro foliosis fulvo-tomentellis cito glabrescentibus, foliorum limbo petiolum 10-plo excedente oblongo-oblanceolato, apicem versus subito longe cuspidato-acuminato basi cuneatim angustato mox utrinque glabro supra nitente subtus pallidiore in

sicco griseo-olivaceo costis secundariis utrinque plurimis interjectis aliis quam se ipsæ vix minus aspectabilibus omnibus maxime patentibus, stipulis lanceolato-subulatis fugaceis, pedunculis solitariis paucisve (sæpe 2-3) patentibus vel recurvis flore longioribus fulvo-tomentellis, calycis lobis 8 ovatis obtusis vel acutiusculis extus tomentellis, corollæ lobis late oblongis obtusis appendicibus suis oblongo-lanceolatis æquilongis, staminibus a corolla breviter superatis antheris sagittatis quam filamenta plus quam triplo longioribus, staminodiis staminibus æquilongis lanceolatis acuminatis extus dense villosis, ovario ovoideo dense villoso stylo columnari æquilongo.

Hab. Entebbe. No. 684.

Folia 12.0-18.0 cm. long., 3.5-5.5 cm. lat., tenuiter coriacea, juvenilia subtus (præsertim in costa media valde eminente) crispule pubescentia cito vero glabra, costæ costulæque fac. sup. prominentiores; petioli 1.3-1.5 cm. long. Stipulæ 0.6 cm. long., griseo-tomentellæ. Pedunculi circa 1.0 cm. long. Calycis lobi 0.65 cm., corollæ lobi 0.5 cm. (tubus 0.15 cm.), filamenta 0.1 cm., antheræ necnon staminodia 0.35 cm., ovarium ut stylus 0.35 cm. long. Bacca globosa, pallide brunnea, leviter polita, sicca circa 2.0 cm. long. et diam. Semina solitaria, 1.7 cm. long.

The affinity of this is with *M. penduliflora* Engl. and *M. dependens* Engl., from which it can be at once told by the lengthily cuspidate-acuminate leaves (a very rare feature of the genus) and the large number of secondary nerves and nervules, the latter scarcely distinguishable from the former.

Jasminum (§ TRIFOLIATA) **Syringa**, sp. nov. Caule volubili distanter folioso glabro, foliis oppositis trifoliolatis (summis perpaucis attamen bifoliolatis necnon interdum alternis) sat longe petiolatis foliolis ovato-lanceolatis apicem versus cuspidato-attenuatis apice ipso acutis basi obtusis lateralibus quam terminale minoribus breviusque petiolulatis omnibus glabris in sicco brunneo-viridibus subtus pallidioribus, cymis terminalibus vel ex axillis summis oriundis foliis æquilongis vel ea excedentibus multifloris ut pedicelli calycem sæpissime excedentes minutissime pallide fulvo-tomentellis, calyce pro rata minuto 5-dentato dentibus deltoideis quam tubus brevioribus vel solum undulato, corollæ parvulæ tubo omnimodo anguste cylindrico quam limbus 5-lobus triplo longiore, antherarum connectivo apice obtuse acuto, bacca didyma carpellis nunc æqualibus nunc inæqualibus.

Hab. Entebbe. No. 721. "Climber with white flowers."

Foliola terminalia modice 8.0-10.0 × 4.0-4.5 cm., lateralia 6.5-7.5 × 3.0 cm., omnia utrobique tenuissime nitida; petioli circa 3.0 cm., petioluli laterales 0.5 cm., pet. terminalis circa 2.5 cm. long. Cymæ axillares modice circa 6.0 cm. long., terminales adusque 15.0 cm., harum rami maxime patentes. Bracteæ subulatæ, solemniter 0.2 cm. long., exstant vero longiores et breviores. Flores albi. Calyx 0.2 cm., hujus lobi dum adsint 0.05 cm. long. Corolla tota 1.2 cm. long.; tubus 0.9 cm. long., basi 0.15 cm. faucibus 0.2 cm. diam.; lobi late obovati, obtusi vel obtusissimi, 0.3 cm. long. Antheræ 0.3 cm. long. Stylus tandem breviter

exsertus, 1.0 cm. long. Baccæ hucusque crudæ late oblongæ, circa 0.5–0.6 cm. $\times$ 0.3–0.4 cm.

Undoubtedly very near the Sierra Leone species *J. Bakeri* Elliot, from which it can be told at a glance by the quite different and remarkably small calyx.

Tacazzea Bagshawei, sp. nov. Caule volubili tereti sparsim pubescente, foliis pro rata amplis petiolatis late ovatis apice cuspidulato-apiculatis basi rotundata distincte cordatis membranaceis utrinque costis costulisque piloso-puberulis exemptis glabris in sicco læte viridibus pag. inf. pallidioribus costis secundariis utrinque 6–7 tenuibus basalibus approximatis, petiolis quam limbus brevioribus crassiusculis supra excavatis puberulis linea interpetiolarari dentibus carente, cymis elongatis maxime ramulosis multifloris pubescentibus ramulis patentissimis, pedicellis calycem multo excedentibus, bracteis lanceolatis acutis dorso pilosulis, calycis parvuli pilosulo-pubescentis lobis deltoideo-ovatis obtusiusculis, corollæ fere usque ad basin partitæ lobis oblongis apice paullulum obliquis glabris, coronæ phyllis maxime attenuatis inferne aliquanto incrassatis necnon amplificatis corollæ lobos paullulum excedentibus, antheris oblongis lobis alternantibus minutis quadratis.

Hab. Entebbe, September. No. 745. "Twiner, with greenish-yellow flowers."

Foliorum limbi modice 7.0–8.0 $\times$ 4.5–6.5 cm., existunt vero majores necnon minores; nervulæ (pag. inf. optime visæ) arcte reticulatæ; petioli 1.0–2.0 (rarius 2.5) cm. long., superne glandulis instructi. Cymæ adusque 6.0 cm. long. et 4.0 cm. diam. Bracteæ 0.15 cm., pedicelli $\pm$ 0.5 cm. long. Calycis lobi 0.1 cm. long., ima basi totidem lat. Corollæ viridi-lutescentis lobi 0.75 cm. long., 0.2 cm. lat. Coronæ phylla 0.8–0.85 cm. long., basi 0.06 cm. lat. Antheræ 0.17 cm. long., 0.06 cm. lat.

To be inserted in the genus next *T. floribunda* K. Schum., from which it is distinguished by the leaves, distinctly cordate at base, bright green when dry and provided with hairs only on the ribs, by the absence of teeth from the raised interpetiolar line, the very small calyx, the corolla with narrower lobes, the longer and narrower coronal lobes, and the narrower anthers.

Cordia Milleni Baker in Kew Bull. 1894, 27. No. 752. Hitherto known only from Upper Guinea (Lagos).

Asystasia longituba Lindau in Engl. Jahrb. xxii. 118. No. 749. A plant till now known only from the Cameroons.

Siphonoglossa rubra, sp. nov. Herbacea, sat elata, caule erecto tereti glabro, ramulis erecto-ascendentibus ad nodos tumidis foliosis puberulis novellis griseo-pubescentibus, foliis ovato-lanceolatis apice obtusis vel acutis vel cuspidato-acuminatis basin versus in petiolum brevem attenuatis margine undulatis membranaceis in sicco læte viridibus utrinque præter pag. sup. costam mediam puberulam necnon pag. inf. costas puberulas glabris cystolithis linearibus abundanter indutis, floribus in axillis solitariis et sessilibus vel in fasciculis cymosis axillaribus pedunculatis vel subsessilibus paucifloris digestis, pedicellis brevissimis vel 0, bractea bracteolisque

subulatis inter se subæqualibus quam calyx multo brevioribus, calycis pubescentis lobis lineari-setaceis sursum attenuatis, corollæ extus piloso-pubescentis tubo calyce fere ter longiore sursum nequam amplificato labio postico latissime ovato obtusissimo labii antici lobis rotundatis intermedio quam laterales paullulum latiori, staminibus brevissime exsertis, antherarum loculis connectivo lato conjunctis æquimagnis sed paullo inæquialtis inferiore basi breviter calcarato, ovario oblongo fulvo-pubescente, stylo incluso glabro.

Hab. Entebbe. No. 750. "Herb with red flowers."

Herbasaltem fere metralis. Folia solemniter 3.5–5.0 × 1.5–2.0 cm. (raro 10.0 × 4.0 cm.); costæ secundariæ utrinque 5–7, arcuato-ascendentes, superiores inferioribus magis distantibus; petioli 0.5–1.0 cm. long., puberuli. Pedunculi summum 2.0 cm. long. Bracteæ bracteolæque 0.2–0.3 cm. long. Flores fide cl. Bagshawe rubri. Calycis lobi 0.6 cm. long., basi 0.08 cm. lat. Corollæ tubus 1.6 cm. long., 0.2 cm. diam.; labium posticum 0.3 cm. long., vix 0.4 cm. lat.; labii antici lobi 0.35 cm. long., intermedius 0.3 cm. lat. Filamenta 0.3 cm., antherarum loculi 0.12 cm. long. Ovarium vix 0.4 cm., stylus 1.4 cm. long. Capsula vix matura 1.2 cm. long., basi contracta, dense pubescens.

This plant, which enjoys the distinction of being the first of its genus to be found in Tropical Africa, is quite unlike any of its American and South African congeners. The flower has been compared carefully with that of *S. Pilosella* Torr., and found to agree with it in all essentials of generic nature. As for the pollen, so alike are the two in this respect, that it is difficult to tell the grains apart. Each grain is ellipsoidal and has a couple of pores, and there are three rows of tubercles on each side of each pore. Dr. Lindau has doubted the propriety of including any South African species in *Siphonoglossa*, but I entirely agree with Mr. C. B. Clarke in supporting Bentham's views on this point.

Justicia extensa T. And. in Journ. Linn. Soc. vii. 44, var. ? *castellana* Hiern, Cat. Welw. Pl. i. 821. No. 728. This variety has hitherto been supposed restricted to the Lower Guinea region (Pungo Andongo). The flowers Dr. Bagshawe notes as greenish-yellow.

Premna melanophylla S. Moore in Journ. Linn. Soc. xxxvii. 196. No. 685. Finer specimens are here to hand than the one which furnished the description. The leaves are 10.0–13.0 × 6.0–8.0 cm. in the limb, and stand on petioles 3.5–6.0 cm. long. The very lax panicles are 8.0–10.0 cm. long, and somewhat more in breadth, and the pedicels grow out to the length of a centimetre or even longer. Dr. Bagshawe notes this as being "a climber in forest."

Coleus (§ SOLENOSTEMONOIDES) **entebbensis**, sp. nov. Fruticosus ramulis bene foliosis patentibus ascendens minute fulvo-pubescentibus, foliis pro rata mediocribus graciliter petiolatis anguste obovato-oblongatis apice cuspidato-acuminatis basi longiuscule attenuatis margine crenato-serratis basin versus integris subtus minutissime pubescentibus pag. sup. costis puberulis exemptis glabris, verticillastris sparsis 2–10- (rarissime 14-) floris in racemis ex axillis summis oriundis folia mox excedentibus dis-

positis, rhachi gracili minute pubescente dein puberulo, bracteis parvis ovatis diuscule persistentibus, pedicellis gracillimis calycem longe excedentibus, calycis florescentis parvi oblongo-ovoidei minute pubescentis tubo quam limbus omnimodo concolor longiore lobo postico late rotundato obtuso reliquis inter se fere æqualibus e basi lata breviter subulatis circa æquilongo, calycis fructescentis aucti glabri plus minus decurvi intus calvi tubo turbinato-infundibuliformi quam lobi 3-plo longiore perspicue nervoso lobis inter se sub-æquilongis, corollæ mediocris puberulæ tubo calyce circiter 6-plo longiore deorsum cylindrico sursum gradatim expanso labio antico tubo æquilongo cymbiformi.

Hab. Entebbe. No. 701. "Shrub in shady forest to 5 feet; flowers scarce; aerial tubers [galls] hooked, easily detached."

Frutex fere orgyalis. Folia modica 6.0–7.0 × 2.5–3.0 cm., creberrime pellucido-punctata; costæ secundariæ utrinque 4–5, ascendentes; petioli 0.6–1.5 cm. long., minute fulvo-pubescentes. Racemi tandem 18.0 cm. long., quando verticillastri inter se 1.0–1.5 cm. distant. Bracteæ circa 0.15 cm. tandem 0.3 cm. long., minute puberulæ. Pedicelli 0.5–0.7 cm. long. Calyx floescens in toto 0.3 cm. long., hujus tubus 0.2 cm. Calyx fructificans 0.8 cm. long., et circa 0.2 cm. lat.; lobus posticus 0.2 cm. long., 0.23 cm. lat.; lobi reliqui rigidi, antichi quam laterales paullulum longiores. Corolla tota 1.8 cm. long.; tubus 0.9 cm., prope basin 0.15 cm. sub faucibus 0.5 cm. diam.; labium posticum late ovatum 0.25 cm. long., anticum 0.9 cm. long. Filamenta e tubo ad 1.0 cm. exserta, horum pars libera 0.5 cm. et (fill. anticorum) 0.7 cm. long. Stylus 2.0 cm., stigmatis lobi 0.05 cm. long.

The young lateral shoots of this plant are liable to be transformed into galls which, with a breadth of 0.3 cm., may attain 2 cm. in length, and are closely covered with coarse reddish hairs slightly hooked at the tip. These galls are easily detached from the plant.

THE RUBI OF GLAMORGANSHIRE.

By THE REV. H. J. RIDDELSDELL.

THE writer is indebted for the materials of this paper to the Rev. W. Moyle Rogers, and also to the Rev. Augustin Ley, in a degree which is difficult to express in summary terms. It may, however, be gauged on a perusal of the detailed records contained in the list.

Up to 1905 the county of Glamorgan had been worked but little for brambles; chiefly by the records of Messrs. E. F. Linton and Ley the number of known forms had reached some thirty to thirty-five. In 1905 Messrs. Ley and Rogers devoted considerable attention to the genus, the former in the Caerphilly and Neath neighbourhoods; the latter, for a whole month, around Cowbridge and Llantrissant, Neath, and the eastern end of the Gower peninsula. Mr. Rogers also paid a visit to Aberdare. The result of these and

other labours is the production of the following list, which places our knowledge of the Glamorgan brambles upon a satisfactory footing. Much, of course, remains to be done, particularly in the expansion of locality records, and in the discovery of new forms; but there is enough already to prove that the coal measures of the county are especially rich, and that the distribution of forms shows interesting links with the South-west of England, with the Severn drainage area, and with Ireland. *R. sulcatus*, *cariensis*, *iricus*, *dentatifolius*, *vestitifolius*, and *thyrsiger* are cases in point. The chief gaps in the list are (besides local forms known to occur, *e.g.* in Breconshire, and therefore to be expected here) *R. carpinifolius*, *Lindebergii*, *Sprengelii*, *mucronatus*, and *Radula* forms. It will be noticed that the new forms described and published by Messrs. Rogers and Ley in this Journal (pp. 58-60) are of high importance in connection with the present list.

The localities are arranged upon the plan of a ninefold division of the county. The divisions, as a rule, agree with the drainage system. The arrangement, though probably as good as any other for geographical purposes, is still an arbitrary one. Division No. 1 is the Gower peninsula as far east as the G.W.R. & L.N.W.R. from Mumbles Road Station to Loughor; No. 2 is the valley of the River Loughor; 3, of the Tawe; 4, of the Neath; 5, Afan; 6, Ogmore; 7, Ddaw; 8, Taff and Ely; 9, Rhymney. No. 8 is far the largest of the divisions, and (along with No. 4) has been more carefully worked than any of the others. The richness of its bramble flora may probably be estimated with some adequacy from the fact that within an area of three miles diameter, including Abernant House, Aberdare, over forty named forms, including five suberecti, have been found, and others of interest await certain determination.

The numbering and arrangement of the forms in this list agree with those of Rogers, *Handbook of British Rubi*. It will be realized that the greatest part of the work upon which the list is founded is Mr. Rogers's, and every record is to be understood as having his authority when it stands *either* simply without indication of authority, *or* with the indication of some authority followed by a mark of exclamation (!). It follows that nearly every form among the fruticose brambles here recorded bears his authority; many localities do not.

New records, or confirmations of old uncertainties, are starred.

1. *R. IDÆUS* L. 1. Clyne Common. Black Pill Lane. 3. Pontardawe (Swansea Scientific Society's 'Proceedings,' 1893). 4. Glyn Neath and Rhigos, *H. J. R.*; Nedd Fechan Glen, in great quantity. Neath to Resolven, *Ley*! 7. Cowbridge. 8. Frequent in woods and by stream sides about Aberdare, from Hirwaun downwards to Penrhiwceiber, and on the bare hills up to about 1000 ft., on both sides of the Cynon Valley; also Merthyr Tydfil, *H. J. R.*; Taffs Well, *Ley & H. J. R.*; Ystradowen Moor, *H. J. R.*; Llantrissant. 9. Wood below Cefn On, and in other spots about Caerphilly, *Ley & H. J. R.*

**Var. asperrimus* Lees. The white fruited form. 9. Rudry, *Ley & H. J. R.*

*2. *R. fissus* Lindl. 3. Moory ground near Pontardawe, *Ley*. 8. Borders of Werfa Wood, Aberdare, and abundantly in the wood; a less erect form than usual. Railway side near Bwlfa Pit, Cwmdare, and glen above Cwmdare, *H. J. R.*

3. *R. suberectus* Anders. 4. Resolven Glen, *Ley*; *W. M. R.* in 1905; abundant at one place; Aberpergwm, *Ley*! 8. Glen above Cwmdare, in quantity.

*4. *R. Rogersii* Linton. 8. Borders of Werfa Wood, and in the wood, Aberdare.

*5. *R. sulcatus* Vest. 8. Borders of Werfa Wood, and in open spots in wood, Aberdare, in plenty. Form with small flowers and panicles.

*6. *R. plicatus* W. & N. 1. Clive (? Clyne) Common, *Fry* in Journ. Bot. 1888, *vide* T. R. Archer Briggs; Rhosili Down, at Llangenydd End. 8. Glen at Cwmdare, form going off towards var. *Bertramii*; roadside, Cwmdare; Werfa Wood and borders, Aberdare.

*8. *R. affinis* W. & N. 8. Peterston Moor, in good quantity. Small form with deeply cut leaflets.

10. *R. cariensis* Genev. One of the most widespread and characteristic of our brambles, extending downwards to the sea-level, but apparently not upwards to the bramble limit. In enormous quantity, and in great masses, generally homogeneous, on the coal measures; on the whole wonderfully constant, and easily recognizable even in deep shade. 1. A common near Mumbles Road Station, *E. F. L.*! 1892; near Rhosili and Rhosili Down, *H. J. R.*; Clyne Common frequent, Langland Bay very frequent, extending to the Head Oxwich Bay, *H. J. R.* 3. Crumlin Burrows, *H. J. R.*; near Pontardawe, *Ley*! 4. Resolven; Nedd Fechan Glen; quantity around Neath; Neath Abbey; all *W. M. R.* Neath to Resolven, common, *Ley*! 5. Port Talbot Docks; Baglan. 6. Near Porthcawl. 8. In great quantity round Aberdare, sometimes in narrow-leaved form; on both sides of the Cynon Valley downwards from Cwmdare and Llwydcoed, *H. J. R.*; Welsh St. Donat's; Ystradowen; near Llantrissant, in plenty; Peterston; Taffs Well. 9. Railway side by Llanishen Tunnel.

*15. *R. incurvatus* Bab. Melin-gelli-gron, near Pontardawe, *Ley*! 8. Llantrissant, near the G.W.R.; "not quite Babington's type," *W. M. R.*

16. *R. lindleyanus* Lees. Often in enormous quantity and great luxuriance, forming remarkably homogeneous masses; woods, hedges, open commons. 1. Clyne Common; Langland Bay. 3. Near Swansea, *E. F. L.*, 1890; near Pontardawe, common, *Ley*! 4. Glyn Neath. Neath to Resolven, common, *Ley*! quantity in Nedd Fechan Glen; Neath Abbey; quantity at Neath and Resolven. 8. Peterston Moor and Ystradowen, in great quantity. About Aberdare fairly frequent, but not so dominating as *R. cariensis* and *cuneatus*. Very great quantity about Llantrissant (G.W.R.) Station. Sometimes has terminal leaflet much broader than usual, as in a frequent Irish form.

17. *R. ARGENTUS* W. & N. (formerly *R. erythrinus* Genev.). Very frequent on the coal measures, but rarely a dominant form like *R. cariensis*, or like *R. rusticanus* and *cæsius* of the limestone districts. 1. Killay and a small common near Mumbles Road (? district No. 3), *E. F. L.*, 1892; Pengwern Common, *H. J. R.*; Clyne Common, frequent; one spot near Langland Bay. near Killay Station, Fairwood Common, &c., and near Rhosili, *H. J. R.* 3. Very common near Pontardawe, *Ley*! 4. Glyn Neath, *E. F. L.*! in quantity in Nedd Fechan Glen; Resolven; Aberdylais; Gilfach and Pencaerau, Neath; Neath Abbey. 5. Baglan, *H. J. R.* 6. Merthyr Mawr. 8. About Aberdare, but not very common; Hirwaun; Welsh St. Donat's; Peterston Moor; Ystradowen, much; in enormous masses and great variety about Llantrissant Station. 9. Caerphilly, Llanishen, wood near Lisvane, and Draethen, *Ley*.

19. *R. RHAMNIFOLIUS* W. & N. 1. Clyne Common. 4. Glyn Neath, *Ley*! common at Gilfach and Pencaerau, Neath; Neath Abbey. Aberdylais and Dyffryn Clydach, *Ley*! 5. Baglan. 8. Peterston Moor; Ystradowen, in plenty; Llantrissant Station; woodland at Aberdare. 9. Craig Llanishen and Caerphilly, *Ley*.

*Subsp. *Bakeri* F. A. Lees. 8. Very rare at Peterston, on the Moor.

*20. *R. NEMORALIS* P. J. Müll. Few bushes at west end of Clyne Common, but with panicle very *ramnifolius*-like. 3. Same form at Melin-gelli-gron, Pontardawe, *Ley*! "Most probably this species, though hardly typical. Not otherwise recorded for Wales," *W. M. R.*

Var. *Silurum* *Ley*. 4. Glyn Neath; Resolven, between the village and waterfall. Rhigos, *H. J. R.* 8. Scattered bushes, not very frequent, in the Cynon Valley from Hirwaun to Werfa Wood, Aberdare; none seen in this district except about the level of 600 ft.; near Penderyn.

*22. *R. DUMNONIENSIS* Bab. 1. Clyne Common. 4. Dyffryn Clydach, *Ley*; Pencaerau and Gilfach, Neath. 8. Road outside Werfa Wood, Aberdare, but not very characteristic.

23. *R. PULCHERRIMUS* Neum. 1. Langland Bay; Clyne Common; Caswell Bay. 4. Glyn Neath, *Ley*; Nedd Fechan Glen; Pencaerau, Neath. 5. Baglan. 8. Not common about Aberdare, but sometimes "very luxuriant, as in Scandinavian specimens," *W. M. R.*; Hirwaun, *H. J. R.*; Ystradowen, plenty; Peterston Moor. 9. Caerphilly, *Ley*.

*25. *R. MERCICUS* Bagnall, var. *BRACTEATUS* Bagnall. 8. Aberdare; Llantrissant.

*26. *R. VILICAULIS* Koehl. 3. Glais, a small form, *Ley*! "Almost identical with my Radnor form," *W. M. R.*

Subsp. *Selmeri* (Lindeb.). 1. Clyne Common. 4. Glyn Neath, *Ley*; Nedd Fechan Glen. Rhigos, *H. J. R.* 8. Well distributed, but not dominant or very common anywhere, in Aberdare (Cynon) Valley; up to 900 ft. at Cwmbach; Peterston Moor; Ystradowen; near Llantrissant Station.

27. *R. GRATUS* Focke. 1. Railway bank, Gowerton to Penclawdd *E. F. L.*!

31. *R. GODRONI* Lec. & Lam. (formerly *R. argentatus* P. J. M.).
 1. Langland Bay, in plenty. 3. Riverside near Glais, form, *Ley*.
 4. Glyn Neath, *E. F. L.*!; Pencaerau, Neath. 8. Taffs Well;
 glen at Cwmdare, Aberdare; and "a peculiar form" from hedge
 near the River Cynon, Aberdare. 9. Mill near Llanishen, *Ley*!

*Var. *robustus* (P. J. Müll.). 8. Near Llantrissant Station;
 Ystradowen; Abernant and Robertstown, near Aberdare.

*Var. *foliolatus* Rogers & Ley. 3. Pontardawe, *Ley*. 4. Pen-
 caerau, Neath. Aberpergwm, *Ley*.

32. *R. RUSTICANUS* Merc. The common plant of the lias and
 mountain limestone, to the exclusion of almost all other forms
 except *R. corylifolius* and *cæsius*. 1. Very common in the hedges
 and woods of Gower, as at Oxwich, Three Cliffs Bay, near Fairwood
 Common, on the cliffs at Llanmadoc, &c., *H. J. R.* Langland and
 Caswell Bays, very frequent; Clyne Common, Mumbles. 3. Near
 Swansea, *E. F. L.* 4. Glyn Neath, frequent on the roadside from
 the station to Pont Nedd Fechan. Neath to Resolven, common,
Ley! Aberdylais; Gilfach and Pencaerau, Neath; Neath Abbey.
 Foreshore of Jersey Marine, *H. J. R.* 5. Specimen in herb. J. Mot-
 ley, 1842 (labelled *leucostachys*) from Craigafan; Port Talbot and
 Baglan, *H. J. R.* 6. Porthcawl to South Cornely, and Merthyr
 Mawr Warren, *H. J. R.* 7. Cowbridge and neighbourhood, very
 common; Barry, Barry Island, Cold Knap, St. Athan's Road,
 Ystradowen; on the shingle of the foreshore, as well as inland,
H. J. R. 8. Very little about Aberdare, *H. J. R.* Peterston;
 Ystradowen; Llantrissant. 9. Cefn On, woods at Caerphilly, and
 on Craig Llanishen, &c., *Ley* & *H. J. R.*

R. rusticanus × *cæsius*. Probably a frequent hybrid. Noted for
 1. Whitford Burrows. 5. Port Talbot.

R. rusticanus × *leucostachys*. 1. Langland Bay, east side for
 several yards, and very luxuriant. 8. Occurring not seldom about
 the River Cynon near Aberdare.

*33. *R. PUBESCENS* Weihe. 4. Gilfach, Neath.

37. *R. MACROPHYLLUS* W. & N. 3. Near Swansea, *E. F. L.*!
 4. Hill-side, Pencaerau, Neath, but some doubt is expressed. 8.
 Aberdare; Llantrissant.

Subsp. *Schlechtendalii* (Weihe). 3. Melin-gelli-gron, Pontar-
 dawe, *Ley*. 4. Pont Nedd Fechan. 8. Peterston Moor, not very
 characteristic.

*Var. *macrophylloides* (Genev.). 8. By Werfa Pit, Aberdare;
 form *umbrosa*.

*39. *R. SALTERI* Bab. 8. Quantity near Llantrissant Station,
 generally in small form; Taffs Well. 9. Hedges and woods about
 Caerphilly, sometimes in great quantity. New to Wales.

*43. *R. HYPOLEUCUS* Lef. & Muell. (formerly *R. micans* Gren. &
 Godr.). 1. Langland Bay; hedge between Caswell Bay and Oyster-
 mouth. 3. Frequent near Pontardawe, *Ley*! 4. Locally abundant
 at Pencaerau, Neath. 8. In several places at Aberdare, in hedges
 and woods; Hirwaun; near Llantrissant Station; Taffs Well;
 Ystradowen.

44. *R. HIRTIFOLIUS* Muell. & Wirtg. 3. Riverside near Glais, *Ley*! 4. Western Nedd Glen, *Ley*! 8. Welsh St. Donat's, form near *R. danicus* Focke.

*Var. *mollissimus* Rogers. 8. Ystradowen, small form. 9. Derwen Deg Wood, Lisvane; and large-leaved form near the tunnel, Llanishen, *Ley*!

*45. *R. IRICUS* Rogers. 8. Peterston Moor. "I believe small weak *iricus*, going off towards my *mollissimus*." "Practically identical with a small *iricus* collected in 1903 (near Kenmare, South Kerry)," *W. M. R.* New to Britain until July, 1905, when it was found by Mr. Rogers and myself in the above Glamorgan locality, and also by Rev. W. H. Painter at Dol-y-bont, Cardigan.

46. *R. PYRAMIDALIS* Kalt. 1. Mumbles, *E. F. L.*! Clyne Common; Caswell Bay, and thence towards the Mumbles; "a small starved eglandular form which Focke would probably call *R. Eifelensis* Wirtg., though no longer keeping it distinct from *R. pyramidalis*"; Langland Bay; Rhosili Down. 3. Swansea, *E. F. L.*! 4. Glyn Neath, *Ley*, "common"; Dyffryn Clydach, *Ley*; Nedd Fechan Glen. 8. Not very common but well distributed in the Cynon Valley about Aberdare from Cwmdare to Cefn Penar, *H. J. R.*; in quantity and very strong at Ystradowen; Llantrissant.

47. *R. LEUCOSTACHYS* Schleich. 1. Clyne Common; Mumbles; frequent at Langland Bay. 3. Near Swansea, *E. F. L.* 4. Rhigos, *H. J. R.*; in very great quantity, with flowers both pink and white, in Nedd Fechan Glen. Glyn Neath, *Ley*; Neath to Resolven, *Ley*! Gilfach, Neath, in great quantity; Pencaerau, Neath; Aberdylais. 5. Baglan, in plenty. 8. Well scattered, but not very common, in the Aberdare Valley; up to 1000 ft.; and Hirwaun Common, *H. J. R.*; near Llantrissant Station; Ystradowen; Peterston. Taffs Well, *H. J. R.* 9. Cefn On; woods, &c., at Caerphilly; road from Rudry to Machen; in great quantity on the limestone and red sandstone of the Craig Llanishen ridge, *Ley* & *H. J. R.*

*Var. *gymnostachys* (Genev.). 8. Cwmbach, Aberdare. "Perhaps slightly nearer to type *leucostachys* than the Bangor and Dorset and Surrey *gymnostachys*," *W. M. R.*

48. *R. LASIOCLADOS* Focke, var. *ANGUSTIFOLIUS* Rogers. 1. Near Langland Bay. 3. Form from Melin-gelli-gron, Pontardawe, *Ley*, of which W. M. Rogers says, "? under my *angustifolius*." 4. Glyn Neath, common, *Ley*! Aberdylais. 8. Ystradowen.

*Var. *longus* Rogers & Ley. 4. Resolven; Pencaerau, Neath.

*52. *R. CINEROSUS* Rogers. 8. Werfa Wood, Aberdare; a plant which is "? *cinerosus* going off towards *podophyllus*," *W. M. R.*

*55. *R. ANGLOSAXONICUS* Gelert, subsp. *VESTITIFORMIS* Rogers. 4. Gilfach, Neath.

*Subsp. *setulosus* Rogers. 4. Resolven, in great quantity on both sides of the river. 8. "A very strongly armed form" at Ystradowen; Aberdare.

*56. *R. MELANOXYLON* Muell. & Wirtg. 8. Taffs Well; form differing "in the cuspidate leaflets and extraordinarily luxuriant

panicle, though very similar in other respects. It seems to go off from that towards *melanodermis*." "Must certainly go to *R. melanoxylon*, M. & W., I think," *W. M. R.*

*57. *R. INFESTUS* Weihe. 4. Gardener's Lane, Neath; form growing with the next, and showing great resemblance to it.

*59. *R. BORRERI* Bell Salt. 1. Clyne Common, West End. 3. Glais, *Ley*! 4. At many stations near Neath; Dyffryn Clydach; Gardener's Lane, Neath. All the preceding records apply to a form marked by "exceptionally strong armature," and by "longer less obovate terminal leaflet, and the looser panicle with narrower top," *W. M. R.* 8. Peterston Moor, type very rare.

*Var. *dentatifolius* Briggs. 4. Neath. 8. Ystradowen, mostly with small panicles. New to Wales.

*60. *R. DREJERI* G. Jensen. 8. Ystradowen; Taffs Well.

Subsp. *Leyanus* Rogers. 1. Fairwood Common; Clyne Common, frequent. 3. Very common near Pontardawe, *Ley*! 4. Plentiful on the coal measures, as at Glyn Neath; in enormous quantity, a very strongly armed form in Nedd Fechan Glen; great quantity at Gilfach and Pencaerau, Neath; Resolven, plenty. 5. Baglan, *H. J. R.* 8. Frequent about Aberdare, on both sides of the valley up to 900-1000 ft.; most typical and luxuriant at about 600-700 ft., where it is almost as frequent as *R. cuneatus*; elsewhere less; varying much in shape and breadth and toothiness of leaflets; Ystradowen; near Llantrissant; Taffs Well. 9. Craig Llanishen; hills and woods at Lisvane, Caerphilly, *Ley*.

62. *R. ECHINATUS* Lindl. 3. Near Swansea, *E. F. L.* in Journ. Bot. 1890, p. 157.

*64. *R. OIGOCLADUS* Muell. & Lefv., var. *NEWBOULDII* Rogers. 8. Coed y Tranches, Ystradowen.

*Var. *Bloxamianus* Colem. 8. Ystradowen. New to Wales.

*66. *R. PODOPHYLLUS* P. J. Müll. 8. Aberdare.

*68. *R. MELANODERMIS* Focke. 9. Caerphilly, near the station and in a wood, but rare. "Usually the leaflets are obovate-truncate, but here mainly elliptic," *W. M. R.* New to Wales.

*70. *R. LEJEUNEI* W. & N. 4. Open wood at Dyffryn Clydach, *Ley*.

*70 bis. *R. ERICETORUM* Lefv. 4. Gilfach, Neath. 8. Form between this and var. *cuneatus* at Cwmdare, Aberdare.

*Var. *cuneatus* Rogers & Ley (*cf.* Rep. B. E. C. 1905, p. 20). 4. Glyn Neath. Rhigos, *H. J. R.*; Nedd Fechan Glen, but no great quantity; Gilfach and Pencaerau, Neath; Resolven, in plenty, form with acuminate point to terminal leaflet. 8. Far the commonest bramble about Aberdare, on both sides of the valley, and up to 1000 ft., in all kinds of surroundings and exposure; from Hirwaun to Penrhiwceiber, *H. J. R.*; breadth of leaflets varies much. Welsh St. Donats; Peterston Moor; Taffs Well; quantity near Llantrissant; Ystradowen, a strong form.

*72. *R. MUTABILIS* Genev. *W. M. Rogers* queries all records except 8. A beautiful plant found among the ruins of an old iron

foundry at Aberdare. Of this he writes: "Undoubtedly *R. mutabilis*, Genev., I believe, in spite of lilac petals and stamens."

*74. *R. FUSCUS* W. & N. 3. Melin-gelli-gron, near Pontardawe, *Ley*. 4. Gilfach, Neath, in great quantity; Pencaerau, and on hill between St. Catherine's Church and Gardener's Lane, Neath. Dyffryn Clydach, *Ley*. 8. Aberdare; Llantrissant. 9. Llanishen, *forma*.

75. *R. PALLIDUS* W. & N. 4. Western Nedd Glen, one spot, *Ley*! Pencaerau, Neath. 8. Aberdare; Llantrissant.

*76. *R. SCABER* W. & N. 4. Neath; Dyffryn Clydach, *forma*, *Ley*! 8. Very strong plants from Llantrissant (G.W.R.) Station; Aberdare, probably this.

*77. *R. THYRSIGER* Bab. 8. Near Llantrissant, "quite typical." Only known previously (in Wales) from Merioneth, where Mr. Ley found it in 1903.

*80. *R. FOLIOSUS* W. & N. 8. Railway side, Gadlys, Aberdare, *type*. Confirmation for Wales.

*81. *R. ROSACEUS* W. & N., var. *HYSTRIX* (W. & N.). 1. Langland Bay. 4. About Gardener's Lane, Neath. 9. Rudry.

Subsp. *infecundus* Rogers. 4. Glyn Neath, *Ley*! *F. F. L.*! Resolven, locally common, *Ley*! Nedd Fechan Glen; Pencaerau and Gilfach, Neath. 5. Margam; Baglan, very fine. 9. Aberdare, in Abernant Park and Werfa Wood, and at Llwydcoed and Fedwhir; Ystradowen, in plenty.

84. *R. KOEHLERI* W. & N. 4. Glyn Neath, *Ley*!

*Var. *cognatus* (N. E. Br.). 8. Peterston Moor; Llantrissant; Ystradowen. Open parts of Werfa Wood, and in other places about Aberdare.

Subsp. *dasyphyllus* Rogers. 4. Glyn Neath, *Ley*! Nedd Fechan Glen, very frequent; common about Pencaerau, Neath. Rhigos, *H. J. R.* 8. Frequent about Aberdare on both sides of the Cynon Valley; seen at 1000 ft. In woods and hedges, by stream sides, and on exposed rocky ground; on waste land such as railway banks; from Cwmdare and Llwydcoed down to Cwmbach, and at Hirwaun, *H. J. R.*

*86. *R. MARSHALLI* Focke & Rogers. 8. In lane on further edge of Werfa Wood, Aberdare. "Not exactly identical with English type, but much nearer to it than to my var. *semiglaber*." Another plant from a tall hedge some three hundred yards distant, which is "a very strong large-leaved variety or form of *R. Marshalli*, indistinguishable from type in panicle outline and armature, but going off remarkably in the large leaves whitish felted beneath," *W. M. R.* New to Wales.

Var. *semiglaber* Rogers. 4. Open hillside south of Gardener's Lane, Neath; nearer this variety than the type. 8. Llwydcoed, Aberdare.

*92. *R. HIRTUS* W. & K. 9. Coed Coesau Whips, Lisvane, Apparently a form of this.

*Var. *rotundifolius* Bab. 4. Nedd Fechan Glen. New to Wales. Subsp. *Kaltenbachii* (Metsch.). 4. Resolven, 1892, *E. F. L.*!

93. *R. ACUTIFRONS* Ley. 4. Glyn Neath, *Ley*.

94. *R. HORRIDICAULIS* P. J. Müll. 4. Rough bank, Glyn Neath, *Ley*! in good quantity in Nedd Fechan Glen. Rhigos, *H. J. R.* 8. Very common in the Aberdare Valley, in every kind of exposure, from damp shady woods and stream sides to bare stony hill tops and hard roadsides. Never varying much, but always easily recognizable by its thick leathery leaves, more frequently ternate or subquinate, with terminal leaflet broadly ovate and extremely truncate, with a short point; white flowers and a large luxuriant highly coloured panicle, with early shining fruit close enfolded by the long sepals. From Cwmdare and Llwydcoed to Mountain Ash, *H. J. R.*; Llantrissant. 9. Caerphilly.

*98. *R. DUMETORUM* W. & N. 1. Clyne Common; Langland Bay, forma, frequent; Mumbles; Oystermouth. 3. Pontardawe, *Ley*! 4. Nedd Fechan Glen; Aberdylais; several spots at Neath; Resolven. 8. Peterston Moor. 9. Wood near Llanishen.

Var. *ferox* Weihe. 1. Near Langland Bay. 4. Glyn Neath, *Ley*; Neath to Resolven, *Ley*! Nedd Fechan Glen. 8. Near Llantrissant Station. 9. Road from Rudry to Machen.

*Var. *diversifolius* (Lindl.). 4. Pencaerau, Neath, form nearest this. 9. Draethen. In wood on north side of Cefn On, Caerphilly. "A remarkable form nearer to *diversifolius* than to any other in our list," *W. M. R.*

*Var. *raduliformis* Ley. 9. In quantity, Coed Coesau Whips, Lisvane, and in other woods near; Llanishen; main road from Rudry to Machen, *Ley*; wood below Cefn On, Caerphilly; and hedge on hillside just over Caerphilly Station, *H. J. R.*!

99. *R. CORYLIFOLIUS* Sm. 1. Oxwich; near Rhosili; Langland Bay. 3. Near Swansea, *E. F. L.* 6. Porthcawl and South Cornely; sand-hills, Porthcawl. 7. St. Athans Road; Barry Island; Cowbridge, on the lias. 8. Peterston and the Moor; Ystradowen; about Aberdare. 9. Caerphilly; Rudry.

*Subsp. *sublustris* (Lees). 1. Langland Bay. 8. Peterston; Taffs Well; Aberdare, "very nearly typical," *W. M. R.* 9. Llanishen.

*Subsp. *cyclophyllus* Lindeb. 1. Langland Bay. 8. Hirwaun, very strong form.

*100. *R. BALFOURIANUS* Blox. 9. Main road from Rudry to Machen; railway side, Llanishen; Draethen.

101. *R. CÆSIUS* L. 1. Oxwich, Three Cliffs Bay, sands at Llanmadoc, Rhosili, &c., abundant on the limestone of Gower, *H. J. R.*; Langland Bay; Oystermouth; Mumbles; Caswell Bay; Clyne Common. Shore at Penclawdd, Llanrhidian to Llanmadoc, Llangenydd, Salthouse Point, *H. J. R.* 3. Crumlin Burrows, *H. J. R.*; Pontardawe, *Ley*! 4. Glyn Neath, plenty by roadside; Neath Abbey; Neath to Resolven. Jersey Marine, *H. J. R.* 5. Kenfig sands, Margam, sands at Port Talbot and Aberafan, and about the docks, *H. J. R.* 6. Porthcawl to South Cornely, sands and hedges, and all about the Porthcawl sand-hills, *H. J. R.* 7. Barry Island,

Barry to Bonvilstone, Cowbridge and Ystradowen, &c., frequent on the lias, *H. J. R.* 8. Peterston Moor; Llantrissant Station; Ystradowen; Aberdare, scarce, *H. J. R.* 9. Woods at Caerphilly, *Ley.*

102. *R. SAXATILIS* L. 4. Craig y llyn, *H. J. R.*; on the mountains about Pontneddfechan (Gutch in *Phyt.* 1842; Dillwyn, 1848); occasionally in the narrow valleys about there (woods in *Phyt.* 1850). 5. Glyn Corrwg (Storrie). 8. Morlais Castle near Merthyr Tydfil, *H. J. R.*

ADDITIONS TO THE FLORA OF WEST LANCASHIRE.

By J. A. WHELDON, F.L.S., AND ALBERT WILSON, F.L.S.

SINCE the publication of our last West Lancashire list (*Journ. Bot.* 1905, pp. 94-96), a number of additional species have been found in the vice-county, and as some of these are of considerable interest, we think it well to put them on record. We also include a few other species which are noteworthy because their rarity renders the discovery of an additional station interesting.

We have again to thank the Rev. W. M. Rogers for kind assistance in naming the brambles, and we also record our indebtedness to Messrs. Arthur Bennett, H. and J. Groves, S. M. Macvicar, and the Rev. G. R. Bullock-Webster for help with various critical species.

New county records are indicated by an asterisk. As in our previous lists, the abbreviations H. B., Wh., and Wi. stand for H. Beesley, Wheldon, and Wilson respectively. Where no authority is quoted, the specimens were found by the authors jointly.

Cochlearia danica L. Hedge-banks between Middleton and the sea, Heysham peninsula, *Wi.*

Viola Curtisii Forster. A large blue-flowered form occurs about St. Annes, which comes near var. *Pesneanii*, and only differs, according to Mr. Baker, by having a more elongated spur, *Wh.*

**Cratægus Pyracantha* Pers. Alien. Several bushes on a low bank near the shore between the Guide's House and Naze Point. Well established, but may have been washed up by the tide, *A. A. Dallman.*

Rubus rhamnifolius W. & N. subsp. **Bakeri* F. A. Lees. Claughton Moor, near Caton, Sept. 1905, *Wi.* — *R. bracteatus* Bagn. Near Staining, *Wh.* — *R. Gelertii* Frider var. *criniger* Linton. Claughton Moor, near Caton, growing near the above, *Wi.* Our previous locality for this (Claughton, near Garstang) is in another part of the vice-county.

Rosa glauca Vill. var. *Reuteri* (Godet). Canal-bank near Yealand. — *R. tomentosa* Sm. var. *cuspidatoides* Crep.? This curious form of *R. tomentosa* is still *sub judice* as to its correct name. It has small subglobose aciculate fruits, and densely aciculate peduncles,

and occurs rather plentifully near Kirkham, in hedges by the road to Lytham, *Wh.*

**Oenothera Lamarkiana* Ser. Sand-hills, in a timber-yard near St. Annes, 1905, *C. Bailey*; and with *O. biennis* near the promenade extension, *Wh.*

Limosella aquatica L. Damp place where water had stood near the shore at Bolton-le-Sands, *Wi.*

Sparganium neglectum Beeby. Near Marton Meer, *Wh.*

Lemna gibba L. Ditches near Marton Meer, *Wh.*

**Zannichellia pedunculata* Reichb. Left bank of the Wyre estuary above Fleetwood, Oct. 25th, 1905, growing with *Ranunculus Baudotii*, which at this late date was still showing a few belated flowers! *Wh.*

Carex Hudsoni Ar. Benn. Bog between Carnforth and Nether Kellet. — Var. **turfosa* Ar. Benn. Marsh near Borwick, *Wi.* — *C. acuta* L. Bank of the Lune, a mile below Caton, and also higher up near Claughton, *Wi.*

Avena pubescens Huds. Bank facing the sea on the coast near Middleton, *Wi.* A rare plant in West Lancashire.

Elymus arenarius L. Very fine and abundant at the north side of Thurshouse Sands, on sandy mud used in levelling the land near the new Heysham Harbour.

Phegopteris calcarea Fée. On cliffs of calcareous shale belonging to the millstone grit rocks in the gorge of the Wyre below Abbeystead; an unusual habitat for this species. Its associates are *Rubus saxatilis*, *Hieracium murorum*, and *Festuca sylvatica*, *Weisia rupestris*, *W. verticillata*, and *Hypnum commutatum*.

Chara fragilis Desv. var. **delicatula* Braun. Clear slow-flowing stream between Borwick and Yealand Redmayne.

Tolypella prolifera Leonh. Canal near Brock, *Wi.*

**Archidium alternifolium* Schp. Near Dolphinholme, 1901, *Wh.* Near Garstang, *Wi.*

Pleuridium axillare Lindb. Bog near Dunnald Mill Hole. Pond side near Garstang, *Wi.* — *P. subulatum* Rabenh. Sandy bank in quarry between Whittington and Kirkby Lonsdale, *W. & W.* Lea and Cadley, *H. B.*

Brachyodus trichodes Furnr. Damp rocks in a gully on Claughton Moor.

Fissidens crassipes Wils. Gorge of the Greeta. — *F. osmundoides* Hedw. On Upper Silurian (Coniston Grit) rocks, Middle Ease Gill.

Campylostelium saxicola B. & S. Damp sandstone rock in gorge of the Greeta near Wrayton.

Phascum cuspidatum Schreb. var. **piliferum* B. & S. Quarry between Whittington and Kirkby Lonsdale.

Pottia lanceolata C. M. Knott End, *H. B.* (sp.).

Barbula Hornschuchiana Schultz. Bank near the mouth of the Keer estuary, *Wi.*

Trichostomum flavovirens Bruch. Near Shard Bridge, *Wh.*

Ulota crispa Brid. On trees near Cowan Bridge.

Ephemerum serratum Hampe. Grassy common on north-east side of Warton Crag, *Wi.*

**Bryum Marratii* Wils. Salt-marsh at the mouth of the Keer estuary, *Wi.* This is a very interesting discovery, as this species has not been seen in the South Lancashire locality for some years.—*B. murale* Wils. Wall in field between Tunstall and the Lune.

Mnium serratum Schrad. Bank of stream, gorge of the Greeta.

Thuidium recognitum Lindb. Open grassy ground near the mouth of the Keer estuary, *Wi.*

Orthothecium intricatum B. & S. Limestone rocks on north side of Kellet Seeds, *Wi.*

Plagiothecium depressum Dixon. Middle Ease Gill.

**Amblystegium compactum* Aust. Shaded limestone rocks at the mouth of Dunnald Mill Hole, June, 1905.—*A. serpens* var. *salinum* Carr. Between Skippool and Shard Bridge, *Wh.* Keer estuary, *Wi.*

Hypnum elodes Spruce. Bog near Dunnald Mill Hole.—*H. giganteum* Schp. Bog between Carnforth and Nether Kellet.

Lejeunia calcarea* Lib. Limestone cliffs near the Witch's Caves, Middle Ease Gill, May, 1905, growing in company with *Metzgeria pubescens*.—L. Rossettiana* Massall. Limestone rocks on Kellet Seeds, March, 1905, and near Silverdale, *Wi.* Associated in both localities with *L. Mackaii*.

Scapania curta Mart. North side of Warton Crag, *Wi.*

Lophocolea bidentata L. var. **rivularis* Raddi. Heysham Moss, July, 1904. We submitted this plant to Mr. Macvicar as a possible new form, and he suggested the above name. This has been confirmed by Dr. C. Warnstorff, who informs us in a recent letter that it agrees exactly with the plant of Mark Brandenburg. The following extract from the *Flora* of Mark Brandenburg has been translated for us by Mr. W. Bellerby, of York, and may be of interest to students of the *Hepaticæ*, as this variety appears to be new to Britain:—"Plants aquatic, stronger and more robust (than type), in dark green tufts upon stones in streams over which water is constantly flowing, or in deep bogs among other mosses. Leaves . . . oblique, broadly ovate from a very much wider base, dorsal side distinctly decurrent, strongly narrowed towards summit, and here for about one-fifth length of the leaf divided into two equal or unequal straight, awl-shaped short lobes. At base 1·7 mm. broad, and the same in height. Cells mostly obscure owing to the rich chlorophyllose cell-contents." On Heysham Moss it occurs in extensive tufts amongst *Sphagnum*. Its texture is succulent when fresh, quite unlike that of the type species.

**Cephalozia connivens* Spruce. Whitestone Clough; Longridge Fell; Nickey Nook.

Nardia hyalina Carr. Greenbank Fell, Hindburn, and in the Great Clough of Tarnbrook Fell, &c. Known as a West Lancashire plant since 1898, but accidentally overlooked in preparing our earlier lists.

**Saccogyna riticulosa* (Mich.). Limestone rocks, Ease Gill, May, 1905. Associated with *Plagiochila spinulosa*, *Peltigera aphthosa*, and *Solorina saccata*.

**Fossombronia cæspitiformis* De Not. Side of footpath on grassy common, north side of Warton Crag, November, 1905, *Wi.*

Blasia pusilla (L.). Near Hurst Green. Coast-bank near the mouth of the Keer, *Wi.*

Riccia sorocarpa* Bisch. North side of Warton Crag, growing with *Fossombronia cæspitiformis* and *Scapania curta*, November, 1905, *Wi.* Near Silverdale, *Wi.*—R. glauca* L. Near Staining, October, 1905, *Wi.* Thrang End, *Wi.*

Ricciella fluitans (L.). Another locality for this has been discovered by Mr. H. Beesley in a pond between Barton and Goosnargh.

NOTE ON FARSETIA STYLOSA.

BY JAMES BRITTEN, F.L.S.

Two plants, neither of them reduced, stand under this name in the *Index Kewensis* :—

“*stylosa* R. Br. in Denh. & Clapp. Trav. App. 12.—Afr. trop.”

“*stylosa* T. Anders. in Journ. Linn. Soc. v. Suppl. i. (1860) 1.—Arab.”

We have in the National Herbarium the specimens collected by Oudney “at the well, Dagarhami,” on the route from Mourzuk to Kouka, January, 1823, which Brown has named *Farsetia stylosa*; these, although, as Brown notes, imperfect, are clearly identical with *F. ramosissima* Hochst. in Kotschy, *Iter Nubicum*, nos. 26, 305 (Flora, 1841, Intell. 42, nomen), and ex Fournier in Bull. Soc. Bot. France, xi. 57 (1864)—a name also retained in the *Index*, over which of course Brown’s name, published in 1826, takes precedence.

Anderson (*l.c.*) cites as a synonym of his *stylosa*, “*Mathiola stylosa* Hochst. et Steud. in Schimper, Pl. Arab. Fel. n. 860” (1837). This, a *nomen nudum*, is placed by Fournier (*l.c.* 56), following Hohenacker in ed. ii. (1843) of Schimper’s Arabian plants, under *F. longisiliqua* Decaisne.

M. stylosa Hochst. is referred in the *Index Kewensis* to *F. Hamiltonii* Royle, which, according to Hook. f. & Anderson (Fl. Brit. Ind. i. 140), is “closely allied to *F. longisiliqua*, but has longer pods.” Whether these be identical I am not prepared to say, although the difference in the pods does not seem to me remarkable; but the identity of *M. stylosa* with *F. longisiliqua* is not, I think, open to doubt. The plant was distributed by Hildebrandt in 1872 (no. 166) as *F. ramosissima*, but the short pods at once separate this from *F. longisiliqua*.

The synonymy is :—

FARSETIA STYLOSA Br. in Denham & Clapperton’s *Narrative*, Appendix, p. 217 (1826).

F. ramosissima Hochst. in Flora xxiv., Intell. 42 (1841) (nomen); Fournier in Bull. Soc. Bot. France, xi. 57 (1864).

FARSETIA LONGISILIQUA Decaisne in Ann. Sc. Nat. 2nd series, iv. 69 (1835).

Mathiola stylosa Hochst. & Steud. in Schimper Pl. Arab. Fel. n. 860 (1837) (nomen), ex T. Anderson in Journ. Linn. Soc. (Botany), v., Suppl. i. (1861).*

F. stylosa T. Anders., l. c.

F. ramosissima Hildebrandt in herb., non Hochst.

Should *F. longisiliqua* be placed under *F. Hamiltonii* Royle, the latter name, published in March, 1834, will take precedence.

NOTE ON KÆLERIA.

BY THE REV. E. S. MARSHALL, M.A., F.L.S.

DR. KARL DOMIN has kindly revised my small British series of this genus. Under *Kæleria gracilis* Pers., he finds but one typical sheet (Walton-on-Thames, Surrey; legit Beeby). Forms more or less tending in the direction of subsp. *K. britannica* Dom., are from sandhills at Deal, E. Kent (the "var. *arenaria* Lej." of Hanbury & Marshall's *Flora*); Burham, E. Kent; Portsoken, Monmouth; Chisledon, N. Wilts; and Sands of Barry, Forfar. Under subsp. *K. britannica* itself the following divergences are identified:—var. *aristata* Dom., from limestone S. of Lough Mask, E. Mayo; var. *brachyphylla* Dom., from chalk-downs above Little Langford, S. Wilts ("differt præcipue foliis brevibus planis, spiculis glabris c. 6 mm. longis trifloris, glumellis longe acuminatis"); forma *pygmæa* Dom., from Rill Head, W. Cornwall; and forma *major* Dom., from Thurso, Caithness. The two last-named I consider to be mere states, due to the situation; and the collective lesson of the specimens seems to be that the subspecific distinctness of *K. britannica* is open to question. My own sheets of the lately rediscovered grass from Brean Down and Uphill, gathered on May 25th and June 7th of last year, are placed as "forma *glabra* G. G. ad var. *alpicolam* (G. G.) vergens"; and a plant collected by Rev. R. P. Murray on Brean Down in 1883 is named var. *alpicola*. In Dr. Domin's recent *Fragmente zu einer Monographie der Gattung Kæleria*, this stands as subsp. *K. alpicola*, described as follows:—"Planta plerumque elatior, foliis obscure viridibus vel haud conspicue glaucis usque 2 mm. latis planis vel solum apice complicatis culmeis laminis magis evolutis unacum vaginis fere glabris, rhizomate rete laxiori donato, culmis superne sæpe usque ad folia villosis, spiculis bifloris, palea sæpe latiori apice brevissime bidentata. Floret VI. Habitat in regione alpina Pyren. et Alpium occ."

* By a curious oversight, the actual dates of publication of the Supplements to the Linnean Society's Journal vols. i-v., are not given in the list prefixed to the *General Index* (1888). The title-page to Anderson's paper is dated 1860, but Mr. Jackson informs me it was actually published on Jan. 8, 1861.

Mr. Druce deserves the gratitude and admiration of British botanists for the acuteness and enterprise with which he identified and tracked down the species so long hidden in Dillenius's herbarium; but, in his heading (Journ. Bot. 1905, p. 313), "*Kæleria splendens* as a British Plant," he has too bluntly proceeded to *brusquer les choses*: that which he goes on to describe not being the Mediterranean species which had been so called for eighty years. I have lately learned that, according to the rules adopted last year at the Vienna Congress, *K. splendens* Presl must be retained; and that our plant should apparently be called *K. vallesiana* Aschers. & Graebn. (1900), as *K. tuberosa* Pers. of 1805 is antedated by *Aira vallesiana* All. of 1789. No doubt a good many other specific names given by the founders of genera will be superseded in consequence of this innovation, which appears to me quite needless and ill-advised. I find that in our plants the young inflorescence is often beautifully tinged with reddish-violet.

[We feel bound in justice to say that we must share any blame that may attach to Mr. Druce for his revival of the name *splendens*. That, as his paper shows, is clearly the oldest specific name for the plant, and we both took as absolute the statement on p. 216 of last year's Journal that the Vienna Conference had decided that "in changing the genus name of a plant, the earliest specific name should be retained." The text of the rules, however, considerably qualifies this statement; we append this for the convenience of those who may wish to know exactly what was decided. We are entirely in accord with Mr. Marshall in regretting the decision of the Conference; and we still think that the position taken by English botanists, that "the name of a species is that under which it was first placed in its accepted genus," is preferable. But the great object is to arrive at finality in the matter; and the retention of the earliest specific name, under the restrictions indicated, will ensure this.

The following is the text of the rule adopted at Vienna:—

"ART. 53. Lorsqu'un sous-genre, une section ou une sous-section passe au même titre dans un autre genre, le nom doit être changé s'il existe déjà dans le genre un groupe valable de même ordre sous ce nom.

"Lorsqu'une espèce est portée d'un genre dans un autre, son épithète spécifique doit être changée si elle existe déjà pour une des espèces valables du genre. De même lorsqu'une sous-espèce, variété, ou autre subdivision d'espèce est portée dans une autre espèce, le nom en doit être changée s'il existe déjà dans l'espèce pour une modification valable du même ordre.

"Exemples: Le *Spartium biflorum* Desf. (ann. 1798-1800), transporté par Spach en 1849 dans le genre *Cytisus*, n'a pu être appelé *Cytisus biflorus*, mais a reçu le nom de *Cytisus Fontanesii* parce qu'il existait depuis longtemps un *Cytisus biflorus* L'Hérit. (ann. 1789), espèce valable pour l'auteur."

ED. JOURN. BOT.]

SHORT NOTES.

JUNCUS ACUTUS IN N.E. YORKS.—A specimen of this plant from a salt-marsh at Coatham, N.E. Yorks v.-c. 62, has reached the British Museum through the hands of Mr. J. G. Baker. It was collected in August, 1905, by Mr. P. F. Lee, of Dewsbury. *J. maritimus* has long been recorded from the same vice-county. The range of *J. acutus* in Britain is chiefly western. It occurs along the Welsh coast from Carnarvon to Glamorgan, and in Somerset, Devon, and (?) Cornwall. It is scattered along the south coast from Hants South to Kent East, and reappears in Suffolk and Norfolk. The discovery of it in Yorkshire adds considerably to its known British range. This appears to be, moreover, the northernmost locality for the species in Europe.—H. J. RIDDELSDELL.

DEVON HEPATICS.—The following hepatics, gathered by me, are none of them given under the Watsonian v.-c. 4 (North Devon) in Mr. Symers Macvicar's *Census List of British Hepatics*. They seem, therefore, to supply first records for this northern part of the county. I gratefully acknowledge help in identification from Messrs. Symers Macvicar, E. M. Holmes, D. A. Jones, J. B. Duncan, and Canon H. W. Lett, whose initials are appended to the species which they have examined. Except where otherwise specified, all have collected at Combemartin: *Reboulia hemisphærica* Raddi. *Conocephalum conicum* Dum. *Lunularia cruciata* Dum. *Aneura pinguis* Dum. *A. multifida* Dum. (E. M. H.). *Metzgeria furcata* Lindb., gemmiferous form (S. McV.). *M. conjugata* Lindb. (D. A. J.). *Pellia endiviæfolia* Dum. (E. M. H.). *P. epiphylla* Dum. *Fossombronia caespitiformis* De Not. ("So far as I can tell, without fruit," H.W.L.), Torrington. *Marsupella emarginata* Dum. (E. M. H.). *Aplozia crenulata* Dum., var. b. *gracillima* Pears. *Plagiochila asplenoides* Dum. *Lophocolea bidentata* Dum. (D. A. J.). *Kantia arguta* Lindb. (E. M. H.). *Trichocolea tomentelia* Dum. *Diplophyllum albicans* Dum. *Lejeunia cavifolia* Lindb., and var. c. *heterophylla* Carr. (E. M. H.). *Anthoceros lævis* L. (E. M. H.).

The following, also, except *Anthoceros lævis* found by myself, are not recorded in the "List" for v.-c. 3 (South Devon): *Reboulia hemisphærica* Raddi, Torquay. *Marchantia polymorpha* L., near Princetown, and in North Bovey River. *Marsupella emarginata* Dum., Heytor, Dartmoor, and on margin of Classemoile Pool, near Dousland, Dartmoor. *Aplozia crenulata* Dum., and var. β . *gracillima* Pears., Newton-Abbot. *Scapania compacta* Dum., Moretonhampstead (J. B. D.). *S. aspera* Bernet, Wistman's Wood, Dartmoor. *S. curta* Dum., Fingle Glen, Moretonhampstead (J. B. D.). *Madotheca rivularis* Nees, Shaugh Bridge, near Bickleigh. *Lejeunia cavifolia* Lindb., Wooston, Moretonhampstead (J. B. D.). *Frullania tamarisci* Dum., Torquay. *Anthoceros lævis* L., Paignton; sent me thence by Dr. Henry Humphreys, of St. Aubin's, Torquay. C. E. LARTER.

MARCHANTIA POLYMORPHA VAR. **AQUATICA.**—In the British Association *Handbook of Southport*, 1903, I suggested that an erect-

growing form of *Marchantia polymorpha* L., occurring at Netherton, near Liverpool (South Lanes), was probably the var. *aquatica* of authors. Last year Mr. Macvicar, to whom I sent specimens, informed me that he had been able to obtain confirmation of the varietal name, and that it could be added to the British list as var. *aquatica* Nees. The locality at Netherton is a piece of apparently aboriginal moss-land, which does not become dry in the most droughty seasons, in which many plants survive that are rare elsewhere in the district embraced by the flora of Liverpool. One of the most interesting of these survivals of former days is *Carex curta*. Other interesting associates of the *Marchantia* are *Sphagnum obtusum*, *S. teres*, *Mnium affine*, and *Hypnum cordifolium*. The hepatic also occurs in a bog near Rainford Junction, and will no doubt be found in many other localities in which suitable conditions obtain. Both sexes occur, but male plants are much more plentiful than female ones.—J. A. WHELDON.

NOTICES OF BOOKS.

Morphologie und Biologie der Algen. Von Dr. FRIEDRICH OLTMANNS. Vol. ii., pp. vi, 443. Illustrated. Jena: Fischer. 1905. Price 12 marks.

THE progress of a science is like a tide rising over a level shore, where the general advance is made up of a number of smaller waves which vary both in time and place. So in a science a certain branch may be left seemingly stationary for a time, and then an advance be made apparently all the more rapid for the previous delay. Such has been the course of events in respect of the Algæ. By the early observers the study of them was actively pursued, especially as regards their identification and geographical distribution; investigation of them has never stood still, though the more exact methods of modern research have been only tardily applied to them. But recently the tracing of the details of their life-cycles from the point of view of modern cytological inquiry has been more actively followed, and any leeway there may have been is being quickly made up.

Hitherto no satisfactory general treatise on Algæ, embodying the results of their modern study in all its aspects, has appeared, though several attempts have been made. Even the treatment of the Algæ in Engler & Prantl's *Natürliche Pflanzenfamilien* was disappointing; for this some explanation is to be found in the fact that the work as it stands shows plainly the effect of joint authorship. At last, however, the results of the modern study of Algæ, from the most varied aspects, have been put together into a coherent form by Prof. Oltmanns, whose *Morphologie und Biologie der Algen* marks a distinct advance in this special branch of botanical science.

There is no algologist of the present day better fitted for the task of writing a general treatise by many-sided investigation of the Algæ, for Prof. Oltmann's personal researches of the last twenty years extend to all the main groups of them. A good

general statement is now more than ever valuable, since, in any phylogenetic system, the origin of more specialized organisms, whether of Fungi or of chlorophyll-containing plants, is to be sought for among Algal forms. Moreover in later years alternation has figured more largely than before in morphological theory. It is becoming daily more plain that a proper understanding of the origin of alternation lies hid among the lower organisms.

The work of Prof. Oltmanns is divided into two parts. The first, published in 1904, and reviewed at some length in this Journal for that year, contains a detailed account of the various Algal types, including the *Flagellatae*, to which so important a place is now assigned by Wille and others, as a theoretical starting-point for the more elaborate Algal forms. It includes, also, the *Charales*, that curiously-isolated group to which no certain place is yet assigned, and which is on that account frequently omitted from Algal works. On the other hand, the *Cyanophyceæ*—which are usually ranked with the Algæ—are left out as being allied more definitely with the Bacteria. The method of the first part is descriptive rather than comparative, though minor comparisons are frequently made between the members of the same group. A full account of the external conformation of each group and of its internal structure is first given, then follows the description of its reproductive methods. The whole is backed by very full tables of the literature referring to each family, but the text is not interrupted or overburdened by detailed references to “chapter and verse,” while the reader is assisted by marginal catch-words, which are of great value for quick reference in so bulky a volume as this proves itself to be. The whole treatment is far the most complete hitherto published, while the numerous figures which illustrate the text are not only well chosen but well executed. The drawings illustrating habit are, for the most part, excellent likenesses.

Naturally the mass of fact accumulated in the first volume serves as the basis for the more general discussions which fill the second. This opens with a consideration of the basis for the systematic arrangement of the Algæ, and, in accordance with the general trend of opinion, the author ranks as indications of affinity of the first importance similarity of cell-structure and the form of the motile cells; following the Swedish botanists, he recognizes in this especially an atavism which points back to an origin from the motile *Flagellates*, from which the Algæ may thus rank as encysted derivatives. The inevitable result is a polyphyletic view of the origin and progress of sexuality, which is in full accord with experience elsewhere, while it is in the Algæ especially that its application might have been most readily anticipated.

The effect is very apparent in the systematic treatment of the old group of the *Chlorophyceæ*. By the more advanced school these are broken up into sub-groups severally characterized by differences of their motile cells, a position which the author accepts, though not in its extreme form. Such lines of comparison, as applied to the simplest organisms, are still at an experimental stage, and the consequent groupings are open to further modifica-

tion; but this view the author himself expresses. Certainly the position which he thus takes up makes the origin of the Algæ more intelligible than has hitherto been indicated in any general treatise upon them.

Though there is in the book only very slight reference to the chromosome-cycle (a matter on which the facts are still few, and often uncertain), nevertheless the author has done full justice to those questions of alternation which are becoming daily more important in their bearing on general morphology. In no group of Algæ has the author himself contributed more to exact knowledge of intricate fact than in the *Rhodophyceæ*. The investigation of the chromosome-story in these is still in its infancy; but the facts as regards nuclear fusion have been so far elucidated—partly by other workers, but largely by himself—that he is able to give a clear conspectus of the morphology of their very variable post-sexual developments. His recognition of the auxiliary cell, as a nutritive adjunct only, has tended to clear the obscurity which surrounded the sporogenous filaments, and confirmed the conception of them as a diffuse form of a post-sexual sporophyte.

Special chapters are devoted to cell-structure, mode of nourishment, conditions of life, vegetative periods, and phenomena of stimulation of Algæ; while, among their adaptive characters, their epiphytic, endophytic, and parasitic habit, as well as their symbiotic relations, are illustrated by numerous examples. The book concludes with a short section on methods of collection and of treatment.

Taken as a whole, this new work is the most elaborate and complete treatise on Algæ hitherto produced. It will be an essential part of the outfit of any algologist. The descriptions are far-reaching, and the criticisms of the work of others singularly fair and appreciative. They are marked by an international equality which is theoretically present in all scientific work, though in this respect writers too often show less catholic sympathies than Prof. Oltmanns. Throughout the reader is sensible of statement at first hand—the author writes from personal knowledge. Where the details of the text necessarily stop short, the very complete tables of literature carry the student to the limits of present knowledge, while the genial spirit of the whole work stimulates him to pass beyond them by personal research.

The publishers have given the book every chance by type and illustration. It might be wished, however, that the weight of learning which it contains were not so practically prefigured by the heavy mineralized paper upon which this excellent work is printed.

F. O. BOWER.

Minnesota Plant Diseases. By Dr. E. M. FREEMAN. St. Paul, Minnesota. 1905. Pp. xxiii and 432.

THERE is, perhaps, no branch of botany to which more attention is given at the present time in America and on the Continent than that of plant diseases caused by parasitic fungi. The subject is of great economic importance, and the literature, in the form of papers, bulletins, reports, &c., increases enormously. Dr. Freeman

has rendered us a true service in compiling all the scattered facts, and in making available the accumulations of knowledge that have been stored away beyond the reach of the general public of plant growers. His aim, he tells us, has, however, not been merely "the cataloguing and describing of plant diseases"; he has sought "to disseminate knowledge about the conditions of diseased and healthy plants and about the more destructive parasites," and has certainly succeeded in writing a book that is packed full of information and of interest.

There are three factors to be considered: "the immediate cause of the disease, the immediate effect on the plant attacked, and the predisposition of plants towards disease." In the first section the author deals with all these points and with fungi generally, leaving aside the diseases caused by insects. The second part of the work is occupied by an account of the specific diseases that have been recorded on Minnesota plants, though in no case are either the plants or their parasites confined to the State of Minnesota.

In pursuance of this method of presenting the subject, the author begins with an account of fungi as parasites and saprophytes. He devotes many chapters to the consideration of their growth and development, their life-methods and life-histories. He then goes on to describe them in separate groups as algal fungi, sac fungi, and basidium-bearing fungi. There is a continual repetition of statements and descriptions which is, to a large extent, unavoidable in dealing with such a complicated subject; but the effect on the reader is somewhat bewildering. The elementary and instructive character of the work seems almost to have been lost sight of in its too general and comprehensive grasp of everything bearing on the life of fungi. A previous perusal of some simpler manual would be of great advantage to the student of Minnesota plant diseases.

Dr. Freeman has tried—not always successfully—to simplify nomenclature by substituting descriptive terms in the place of the scientific names that discourage beginners. We are unavoidably reminded of a previous attempt to popularize mycology by the introduction of a long series of appropriate titles for the larger fungi, that included such names as the "Sickener" and the "Sickener's sister." Though it might aid greatly the extension of knowledge of the subject if homelier names could be employed, there would be inevitably a corresponding loss in exactness; thus "Smother Fungus," one of Freeman's new terms, might be applied to many others besides *Thelephora laciniata* to which it is allocated. "Saddle fungus" commends itself as appropriate after you find out that *Helvella* is the plant signified; but "Helvella" itself is a simple and pleasant designation. A striking illustration of the growing knowledge of fungi is afforded by the accounts given of the smut of wheat and barley. The exact method of infection of the host-plant was undiscovered when the book was written, and consequently "no sure method of prevention is known." Almost simultaneously two papers were being published by Ludwig Hecke and, a little later, by Brefeld, describing most convincingly the infection of wheat and barley by smuts and the further developments of the fungus. This contribution of the German botanists to our knowledge of the life-

history of smuts should give the clue to the practical agriculturist in his treatment of the disease.

No treatise of plant diseases is complete without suggested remedies. Keeping the plants in health is of the first importance, and attention to sanitation is insisted on, as also the choice of seeds and seedlings free from disease. Much also can be done by the selection of immune varieties. A very careful account is given of the various fungicides, and the most advantageous methods of applying them.

In reference to the danger of poisoning in connection with spraying, the author tells us, for our comfort, that it has been estimated that a person would require to eat eight to ten barrels of apples treated with arsenic spray before he would suffer any injury from the poison.

The book has been issued under the auspices of the University of Minnesota, to which "is due the credit for making financially possible the collection of material and illustrations and the publication of this work." The Board of Regents have not stinted either the author or the publishers; the illustrations are abundant, and extremely good. We can but envy a country and a University where such liberal things are devised and carried to completion.

A. LORRAIN SMITH.

Suggestions for Beginning Survey Work on Vegetation. To be obtained from the Editor of *The New Phytologist*, University College, London, W.C. Price 3d., post free.

ANYTHING comes as a relief to the dull monotony and hide-bound formalism of existing floras. The oecological method, as exhibited here, is practically on the same lines as the four parts of Messrs. R. & W. G. Smith's *Botanical Survey of Scotland*. It is a welcome contribution, open to sharp criticism no doubt, but on the whole we have nothing but praise for it. The wealth of organized facts which this method, when properly applied, brings together and exhibits as in one view, is as pleasing and novel as the means of collecting the material are searching and new.

A "vegetation-survey"—i.e., a systematic record of the inter-relation of species to one another, as well as their environment—differs wholly from a record of geographical dispersal in river areas or counties; it weighs, as in a balance, every concomitant oecological condition, and, in recording the result, gives an analysis of the means by which it is brought about. "The common conditions of life" are studied as "units"; then, whether we analyse the simplest vegetation-unit or "plant-association," or larger aggregates, including groups of associations called in this method "plant-formations," the result of accumulated work must be the same in result. We shall have distribution finally depicted as it exists, with logical reasons for its persistence,—not an artificial method of describing living facts. The fir, or oak wood, with its dominating mass of bluebells (*Scilla*), if the soil permits of it, or the moorland, with its rampant ericaceous growth and sub-

dominant vacciniaceous and graminaceous undergrowths, will become on paper living realities. We shall not only have a record of the existing product "of the laws of Nature," or more simply of environment, fully analysed before our gaze, but we shall possess a record of every transition in the growth and development, with their underlying causes revealed and explained. Now for a word of criticism.

Should this pamphlet be reprinted—as we hope it may be,—more should be made of altitude, geology, and rainfall. The larger modern maps are explicit, and it is easy to jot down "alt. 17-18," *i.e.*, altitude above Ordnance datum 1,700 to 1,800 feet. The slightest mixture of soils produces huge changes at once; this, surely, is botanical geology. The moisture question, even on heights lower than the Yorkshire hills, is a singularly pretty problem, in considering their eastern and western flora. How the writer of this pamphlet, for the sake of popularizing the subject, could let the following sentence slip from his pen we cannot understand: "It goes without saying that a good field knowledge of our native plants is most desirable if the notes are to be thorough." Surely "is absolutely necessary" should be the phrase. In our experience the observations of trained experts only are of value in ecological studies. Everyone who hopes to become "a master," and to make this method his own, should study, along with this and the other pamphlets of the forthcoming series, Messrs. R. & W. G. Smith's pamphlet referred to above.

E. A. W.-P.

BOOK-NOTES, NEWS, &c.

THE most recent part of the *North American Flora* (issued Dec. 18th, 1905) of which we gave some account last year (p. 311), consists mainly of the *Saxifragaceæ*, elaborated by Messrs. Small and Rydberg. The multiplication of genera and species, which characterizes so much recent American work, is in full force here, and it is impossible not to wonder how far this elaboration will commend itself and be ultimately accepted. There is, of course, always room for considerable difference of opinion as to what constitutes a species, and of this the genus *Heuchera* gives abundant evidence. Seventy-two species are described, of which twenty-six are new; but of these a large number were strangled at birth by Dr. C. O. Rosendahl in what seems to be a very carefully elaborated paper on "Die nordamerikanischen *Saxifraginæ*," published in the *Beiblatt zu den Botanischen Jahrbüchen*, dated Dec. 22nd, 1905; he reduces seventeen (besides one with doubt) of Mr. Rydberg's species to synonyms and relegates six to varietal rank, while five, raised from that to specific rank by Rydberg, are again reduced to varieties by Rosendahl; so that against twenty-six species of *Heuchera* published as new on Dec. 18th must be set twenty-eight reductions to synonymy four days afterwards. It is not for us to say which estimate approximates most nearly to truth; but it is impossible not to view with concern the tendencies to extreme differentiation exhibited by so

many of the younger, and not absent from some of the older, American botanists.

THE last part of the *Journal of the Royal Horticultural Society* (price 15s.) is a bulky volume of seven hundred pages, containing a great variety of matter, much of it of interest to the botanist as well as to the horticulturist. Mr. Boulger has an extremely interesting paper on "The Preservation of Wild Plants," from which we hope at a later date to give some extracts; Dr. M. C. Cooke writes on "Fungoid Pests of Foreign Trees," his paper being illustrated by three coloured plates; Mr. E. S. Salmon has an illustrated account of the fungus disease of *Euonymus japonicus*; Mr. John Bidgood writes on "Floral Colours and Pigments"; Prof. Henslow has an essay on "Geographical Botany as the result of Adaptation"; and Captain Arthur Smith contributes an account of "Plant Consciousness," in which he tells us that "it is not only in the fully developed vegetable organism that we find evidence of the existence of brain-power, but this power begins to display itself with the germination of the seed." The only drawback to this excellent publication is the ridiculous practice of sprinkling the pages with illustrations in no way connected with the text. The traditional Irish adage, "Whenever you see a head, hit it," seems to have as an analogue at the Horticultural Society, "Wherever you see a space, fill it." The result is at times amusing and always inappropriate; the fact that none of the cuts are named deprives them of any possible usefulness. We have a suspicion that, in these days of puzzle-competition, the Society has somewhere offered a prize to those who name the greatest number of these anonymities, but we find no reference to this in the Journal itself. The explanation, however, gains probability from the nature of some of the figures; such, for example, as the dissection on pl. clx. The extensive series of "notes and abstracts" is exceedingly well done, and should be very useful.

THE *Bulletin of the Société Botanique de France* has issued as an appendix to its fifty-first volume of nearly four hundred pages a catalogue of the *Hortus Vilmorianus*, drawn up by M. Philippe L. de Vilmorin, vice-secretary of the Society. The work, though interesting, seems little more than a glorified catalogue, an impression strengthened by the numerous cuts in the text, some of which have a familiar aspect.

THE *Materials for a Flora of the Malayan Peninsula*, in which Sir George King now has the assistance of Mr. J. S. Gamble, makes steady progress, nos. 16-18 having recently—we think each should bear the date of its publication—been issued. They contain plants of the orders (in the Bentham-and-Hooker sequence) *Rubiaceæ* to *Sesameæ*, and include a large number of new species; the descriptions throughout are very full.

VOL. iv. Sect. 2, part ii. of the *Flora of Tropical Africa* contains the conclusion of the *Convolvulaceæ*, by Mr. J. G. Baker and Dr. Rendle; the *Solanaceæ*, by Mr. C. H. Wright; and the greater part of the *Scrophulariaceæ*, by Messrs. Hemsley and Skan.

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No. 520

APRIL, 1906

Vol. XLIV

THE
JOURNAL OF BOTANY
BRITISH AND FOREIGN

EDITED BY

JAMES BRITTEN, K.S.G., F.L.S.

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THE JOURNAL OF BOTANY was established in 1863 by Dr. Seemann. In 1872 the editorship was assumed by Dr. Henry Trimen, who, assisted during part of the time by Mr. J. G. Baker and Mr. Spencer Moore, carried it on until the end of 1879, when he left England for Ceylon. Since then it has been in the hands of the present Editor.

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Bibliographical matters have also received and continue to receive considerable attention, and the history of many obscure publications has been elucidated. Every number contains reviews of new and important books written by competent critics: in this as in every other respect a strictly independent attitude has been maintained. While in no way officially connected with the Department of Botany of the British Museum, the Journal has from the first been controlled by those whose acquaintance with the National Herbarium has enabled them to utilize its pages for recording facts of interest and importance regarding the priceless botanical collections which the Museum contains. In 1896 it became necessary to increase the size of the Journal, owing to the number of papers sent for publication: the number of plates was at the same time augmented.

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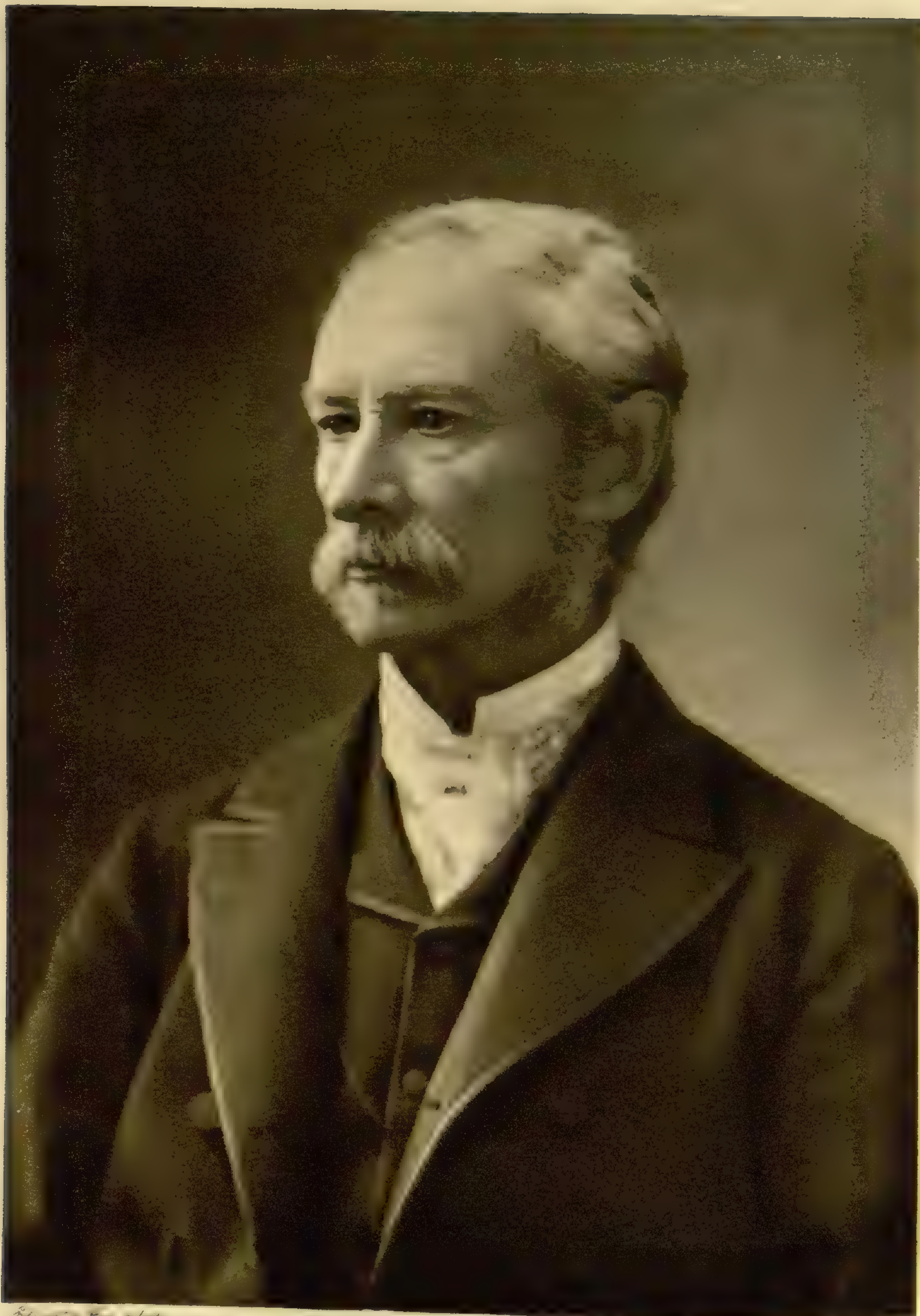
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FREDERICK TOWNSEND.

FREDERICK TOWNSEND.

(1822-1905.)

(WITH PORTRAIT.)

THE death of Frederick Townsend at Cimiez, Nice, on December 16, has removed from among us the Nestor of British botanists, and one of the very few remaining whose names appear in the list of contributors to the first volume of this Journal. For more than half a century his name has been familiar to our readers; and only last year he published the second edition of his *Flora of Hampshire*, which may be regarded as his most important work.

Frederick Townsend was born at Rawmarsh, Yorkshire, on December 5, 1822. He was the second son of the Rev. Edward James Townsend, then rector of Rawmarsh and later of Ilmington, near Honington, and grandson of Mr. Gore Townsend, of Honington, and Lady Elizabeth, daughter of the fourth Earl of Plymouth. He was educated at Harrow and at Trinity College, Cambridge, where he took his B.A. in 1850, proceeding to M.A. in 1855. At Cambridge he became acquainted with Babington, with whom, and in company with Newbould, as we learn from Babington's diary, he took botanical rambles round Cambridge as early as 1847. Before this time, however, Townsend had become an experienced and even a critical botanist; his first paper (that on his *Glyceria pedicellata*, published in 1850 (Ann. Mag. Nat. Hist. v. 104)) begins "In 1846 I drew up a description of [the] supposed new species."

It will thus be seen that from the first Townsend was an adherent of the critical school of which Babington was the pioneer in so far as it directed attention to the work of continental botanists; and his published papers, with the exception of that on Scilly plants, published in this Journal for 1864, are almost entirely concerned with the elaboration of segregates—the Scilly list was drawn up during a visit to the "lord" of the islands, of whom Townsend was a connection. Most of his papers appeared in this Journal; they include notes on the morphology of *Carex* and other monocotyledons (1873, 162, and 1885, 65); on *Anthoxanthum*, especially *A. Puelii* (1875, 1); on *Cerastium* (1877, 33); on *Festuca* (1879, 155, and 1881, 242); on *Carex flava* (1881, 161); on *Ranunculus acer* (1889, 140, and 1900, 379); on *Lepidium* (1900, 420) and 1903, 97). Of late years his attention was concentrated upon *Euphrasia*, of which he published a monograph of the British species, with illustrations from photographs, in this Journal for 1897, and additional papers in subsequent volumes; on this genus he was working till the last. His latest contribution to our pages was a note on *Galium sylvestre* (Journ. Bot. 1904, 240) which he had collected in Worcestershire in June of that year.

One of Townsend's most interesting discoveries was that of *Erythræa capitata* in the Isle of Wight; this was first announced in this Journal for 1879, p. 328, and subsequently formed the subject of a paper in the *Journal of the Linnean Society* (Botany, xviii. 398), published in 1881, and of further communications to

this Journal (1881, 87, 302). In 1878 he published (Bull. Soc. Bot. France, xxv. 15) a paper (in French) on *Veronica lilacina*, a plant found by him on the Bel Alp, Valais, which he considered distinct from *V. bellidioides* L. An early note (Bot. Gazette, iii. 50 (1851)) on a monstrosity of *Daucus Carota* which he had gathered in Guernsey; and one on a form of *Euphrasia curta* (forma *piccola*) in the *Annals of Scottish Natural History* for July, 1871 (p. 177) practically exhaust his contributions to periodical scientific literature. He was, however, the first to indicate the distinctness of the *Spartina* subsequently described as a species by the Messrs. Groves, who named it in his honour *S. Townsendi* (see Journ. Bot. 1879, 277; 1882, p. 1, t. 225).

His principal undertaking was of course the *Flora of Hampshire*, upon which he worked steadily during the nine years (1865–1874) during which he lived in that county. This was practically ready for publication in 1880, in which year he contributed some notes on Hampshire plants to this Journal (p. 50); but he was compelled by illness to abstain from work for two years, and the book was not issued until 1883. It was reviewed at length by Mr. Archer Briggs (Journ. Bot. 1883, 120), who rightly described it as “a flora of a first-class description”; there is thus no need to say more about it now, or about the second edition, which appeared towards the end of 1904 and was noticed in the January following (Journ. Bot. 1905, 33); in this the author had the assistance of the Rev. E. S. Marshall. Each edition contained an appendix of notes on critical genera; the notes on *Salicornia* in the second edition and those on the *Euphrasias* sent to the Watson Exchange Club and published in its Report for 1904–5 represent Townsend’s latest work. He also prepared the account of Hampshire botany for the “Victoria History” of the county published in 1900.

When a young man Townsend wished to become an artist by profession; he travelled in Italy with Paul Naftel and painted in his company. Although his desire was not gratified, he continued to draw, and later became an expert photographer. He was also a proficient in the now almost obsolete sport of archery, and was a familiar figure in the hunting-field; at about seventy-four he took up bicycling. A reader and a student, he was much influenced by the teaching of Ruskin, of whom he was a profound admirer.

In 1863 Townsend married Miss Mary Elizabeth Butler, who, in 1875, founded the well-known Girls’ Friendly Society; for *Friendly Leaves*, the little magazine of that body, Townsend wrote a series of “Chapters on Plants,” illustrated from his drawings. In 1865 they settled at Shedfield Lodge, near Wickham, Hampshire, remaining there until 1874, when on the death of his uncle, the Rev. H. Townsend, he succeeded to the family residence, Honington Hall, Warwickshire, an interesting classicized house of the seventeenth century, of which many illustrations were given in *Country Life* for June 25, 1904. Townsend greatly improved the house, and created the beautiful herbaceous garden, wherein were plants collected in his travels and sojourns in Europe, and others brought back from America and Canada,

which he visited in 1891 ; during this visit he collected, at Quebec, his *Euphrasia canadensis*, which he described and figured in this Journal for 1898 (p. 1, tab. 381).

Townsend's life at Honington is summed up in a local newspaper as that of "a generous landlord and an ideal country squire." He was a staunch Churchman and Liberal ; Conservative during the Home Rule scare of 1886 he was adopted as the Unionist candidate for the Stratford-on-Avon division, and was returned to Parliament, where he continued to represent the division until 1892.

During his visits to London, Townsend frequently consulted the National Herbarium at the British Museum, where he was always a welcome visitor. His most intimate botanical friend, however, was Newbould, whose attitude towards critical botany resembled his own ; he also became intimate with Reginald Pryor, towards the end of the latter's too short life. He made Newbould's acquaintance when the latter was curate at Bluntisham ; they first met at Madingley, Cambridgeshire, on one of Henslow's botanical excursions about 1846, and "immediately fraternized." The intimacy thus begun was continued until Newbould's death ; he paid long visits to Townsend at Shedfield Lodge and at Honington, at which latter place he undertook clerical duty during a vacancy in the family living.*

Well read and endowed with various accomplishments, Townsend was modest and retiring in character ; indeed, one who knew him intimately regarded humility as his most striking characteristic. The respect and esteem in which he was held by all classes at Honington found expression in the various local papers, which vie in their appreciation of his "generous, kindly nature," his "high culture and high ideals."

Townsend became a Fellow of the Botanical Society of Edinburgh in 1846, and of the Linnean Society in 1878 ; he was also a member of the Société Botanique de France. His herbarium and botanical library have been placed in the hands of Mr. A. O. Hume, in trust for the scientific institute projected for South London.

The portrait accompanying this notice is from an excellent photograph by Messrs. Elliott and Fry, taken in 1896.

JAMES BRITTEN.

SOMERSET PLANT-NOTES FOR 1905.

By REV. E. S. MARSHALL, M.A., F.L.S.

THE material for this paper, which is mostly additional to my old friend Rev. R. P. Murray's excellent Flora of the county (referred to below as Fl. Som.), was collected in the spring and early summer of last year. The brambles of my present neighbourhood (near Taunton) look decidedly interesting ; but their flowering season was unusually short, and they were mostly over by the time

* The biography of Newbould in this Journal for 1886, pp. 161-174, contains various details of the relations between the two botanists.

of my return from Scotland at the end of July. The stations in districts 1, 2, 3, 4, and 6 belong to v.-c. 5, S. Somerset; those in 5, 8, 9, and 10 to v.-c. 6, N. Somerset.

My thanks are specially due to Messrs. Arthur Bennett and H. W. Pugsley for help with certain critical forms. An asterisk denotes a new vice-comital record.

Ranunculus Drouetii Godr. 5. Ditches near Othery. 9. Frequent in the rhines about Berrow and Blean.—*R. heterophyllus* Fr. 3. Pond at W. Monkton Rectory.—*R. Baudotii* Godr. 9. Blean; Uphill.—*R. Lenormandi* F. Schultz. 1. Between E. Anstey and Brushford.—*R. sceleratus* L. 2. Minehead. 3. W. Monkton; Cheddon Fitzpaine. 5. Othery. 9. Uphill.—*R. Flammula* L. 6. Wet ground between Castle Neroche and Blackwater; new for this district.—*R. auricomus* L. 3. W. Monkton; scarce.—*R. parviflorus* L. 2. Coast near Williton. 5. Plentiful about Aller and High Ham among bushes, in wood borders, and on dry slopes.

Glaucium flavum Crantz. 2. Shingly coast below Williton, in plenty.

Capnoides claviculata Druce (*Corydalis*). 3. Near W. Monkton.

Fumaria Boræi Jord. I believe that the records for *F. confusa* in Fl. Som. should be transferred to this species, and those for *F. muralis* to *F. confusa*. I have seen the type at 2. Williton and 3. W. Monkton; var. *serotina* Clavaud at 2. Dunster, 3. between Cheddon Fitzpaine and Kingston, and abundantly about W. Monkton. The fruit is not unfrequently subapiculate when fresh in this neighbourhood. I am inclined to think *F. Boræi* a true native in South-west England, where it is by no means confined to cultivated ground.

**Barbarea intermedia* Boreau. 3. In a sown grass-field at Coombe, W. Monkton; probably introduced with the crop.

Arabis hirsuta Scop. 9. Near Bleadon.

Erophila præcox DC. (*brachycarpa* Jord.). 3. Walls at W. Monkton and Bathpool. 9. Wall in the village of Bleadon.—*E. virescens* Jord. *2. Abundant but very dwarf on Minehead Warren, coming into flower a little earlier than *E. præcox*. *9. On the "green" fronting Berrow Church, with *Erodium maritimum*; some of these specimens have broader fruits than our usual British form, in which they are rather jujube-shaped, thus coming nearer to Jordan's figure. The broad, fleshy, bright green, glabrescent root-leaves of this species, arranged in a flattish rosette when well developed, at once distinguish it from our other forms of the genus.

Sisymbrium Thalianum J. Gay. 3. W. Monkton.

Brassica sinapioides Roth. 2. Coast near Williton and Dunster.

Diplotaxis muralis DC. 9. Uphill; Rodney Stoke, 1883.

Lepidium Smithii Hooker. 2. Near E. Anstey. 3. W. Monkton.—*L. Draba* L. occurs sparingly on the shore between Minehead and the Warren; it will doubtless soon make good its hold here as elsewhere. *Hesperis matronalis* L. grows by the railroad about midway between E. Anstey and Brushwood; probably escaped from a neighbouring farmhouse garden.

Reseda Luteola L. 2. Williton; Blue Anchor. 3. W. Monkton. 9. Uphill.

Helianthemum polifolium Miller. 9. The plant with pale yellow flowers, first noticed with the normal form by Mr. H. S. Thompson on Purn Hill, Bleadon, is doubtless *H. Chamæcistus* × *polifolium*. Dr. Focke (*Pflanzenmischlinge*, p. 45) says that it "has been found growing wild in various forms, which seem to eliminate the differences between the two species, so that they have been taken for races of one and the same species." *H. Chamæcistus* appears to be absent from Brean Down, where a careful search revealed no deviation from the type.

Viola palustris L. 4. Staple Common. 6. Boggy ground south of Castle Neroche. — *V. hirta* L. 2. Williton. 3. W. Stoke. 4. Near Staple Fitzpaine. 9. Brean Down; Bleadon, &c. — *V. silvestris* Reich. 3. W. Stoke; in a cottage garden at Bathpool. 5. Beer Wood, Aller. 9. Bleadon. — *V. Firiniana* Reich. var. *nemorosa* Neum., Wahlst., & Murb. 2. Wooded coast near Blue Anchor. 3. W. Monkton. 5. Beer Wood, Aller. Flowers large, produced later than in the type; spur usually coloured. — *V. ericetorum* Schrad. (*canina* auct. mult.). 2. Minehead Warren; local.

Polygala vulgaris L. 2. St. Audries. 5. Aller. 9. Bleadon Hill. First definite notice for these three districts. — *P. oxyptera* Reich. *1. By the railway near E. Anstey, just in Somerset; a remarkably strong, many-stemmed form. 9. Sparingly near Uphill Church. — *P. serpyllacea* Weihe. 1. Between E. Anstey and Brushford. 4. Staple Common. 6. Between Castle Neroche and Blackwater.

Silene conica L. 2. Abundant last year on Minehead Warren; I fully believe it to be native, as the locality is similar to its Kent and Sussex stations. — *S. noctiflora* L. 3. Casual in an oat-field, W. Monkton; only one plant was seen.

Lychnis Githago Scop. 2. Williton.

Cerastium quaternellum Fenzl (*Mænchia quaternella* Ehrh.). 3. Plentiful over a small extent of rocky ground at Beacon Top, near W. Monkton. It grows on Minehead Warren (2), as is suggested in Fl. Som. — *C. tetrandrum* Curt. 2. Coast, Williton. 9. Berrow; Brean; Brean Down; Uphill; Crook Peak, ascending to 600 ft. — *C. pumilum* Curt. 9. Bleadon Hill; Crook Peak, up to 600 ft. On the ridge of Brean Down I gathered some remarkably luxuriant specimens; one of these measures 7 in. by 5 in. in its greatest length and breadth. — *C. semidecandrum* L. 9. Abundant on the sand-hills at Berrow; Crook Peak, to over 500 ft.

Stellaria aquatica Scop. 3. W. Monkton and Bathpool. — *S. media* Cyr. var. *Boræana* (Jord.). 2. Minehead Warren; abundant. 8. Burnham. 9. Berrow; Brean (and south side of Brean Down); Crook Peak. — *S. umbrosa* Opiz. 2. Dunster; Blue Anchor; Williton. 3. Remarkably common in this district, e.g., Taunton, Cheddon Fitzpaine, W. Monkton, Thurloxton, Durston, Creech St. Michael, and N. Curry. 5. Aller. 10. Friary Wood, Hinton; roadsides, east of Frome. — Var. *decipiens* mihi (Journ. Bot. 1902, 215). 10. Near Frome. Especially in district 3, I frequently find asso-

ciated with the glabrous form one having hairy sepal and pedicels, but in no other respect different; evidently the same as observed by Mr. J. W. White near Bristol, and by Rev. W. R. Linton in Derbyshire. As it appears quite doubtful whether this or the hairy plant with bluntly tubercled seeds (my var. *decipiens*) is *S. neglecta* Weihe, I venture to think that my much-criticized proposal to retain the name of *S. umbrosa* for our prevailing glabrous, acutely tubercled form has received additional justification. All three forms grow together near Dulverton (district 1).—*S. uliginosa* Murr. 6. Boggy ground south of Castle Neroche. Mr. Murray had no record from this district.

Arenaria leptoclados Guss. I cannot recollect having ever found any connecting links between this and *A. serpyllifolia*, and believe it to be distinct. Far the commoner plant of the two, at least in S. Somerset. 2. Minehead; Williton, &c. 3. W. Monkton; Durston; Kingston. 9. Bleadon; Crook Peak (up to the summit); Brean Down; near Brent Knoll. 10. Abundant on the Bath oolite.

Sagina apetala L. and *S. ciliata* Fr. 3. W. Monkton.

Lepigonum rubrum Fr. 3. Sparingly on Beacon Top, near W. Monkton.—*L. salinum* Kindb. 9. Uphill.

Hypericum Androsæmum L. 5. Beer Wood, Aller.—*H. elodes* L. 4. Staple Common.

Malva moschata L. 1. Between E. Anstey and Brushford. 3. W. Monkton.—*M. rotundifolia* L. 9. Uphill.

Linum angustifolium Huds. 8. Frequent about N. Wotton, 1882.

Geranium pyrenaicum Burm. fil. 9. Uphill; not native.—*G. pusillum* L. 2. Coast near Minehead; scarce. 3. Hilly pasture, W. Monkton; fine and fairly plentiful.—*G. columbinum* L. 3. W. Monkton. 9. Uphill.

Erodium cicutarium L'Hérit. 3. Near Bathpool. 9. Bleadon Hill, &c. — *E. moschatum* L'Hérit. Unquestionably native in Mr. Fry's station at Purn Hill, Bleadon, where I found it on April 1st with many well-formed fruits, and almost dried up on May 5th. Last season, at least, it was quite a small prostrate plant, 2–6 in. across, and looking very unlike any *E. moschatum* that I had previously met with. There was a total absence of the usual musky smell; Major Wolley-Dod has noticed the same thing at Gibraltar, where it is common. I suspect that the present plant, like other species with which it grows, belongs to a southern type of distribution; possibly it may be the "*E. australe* Salzm. (= var. *minor*)" of Nyman, *Conspectus*, p. 139. In *Fl. Plymouth* Archer Briggs mentions that *E. moschatum* occasionally produces a few flowers as early as March. I can confirm the occurrence of *E. maritimum* L'Hérit. on Brean Down, as recorded by Sole.

Genista anglica L. 1. Brushford; it is abundant about Morebath, just outside the county border.

Ulex Gallii Planch. 1. Brushford. 3. W. Monkton. 9. Bleadon Hill.—*U. nanus* Forster. 4. Staple Common; abundant.

Ononis repens L. 2. Minehead Warren; Blue Anchor; Williton. 4. Staple Fitzpaine. 8. Burnham. 9. Berrow; Uphill.

Trigonella purpurascens Lam. 2. Minehead Warren (frequent), as suggested in Fl. Som. 9. On Brean Down, very local, at 200 ft.

Medicago arabica Huds. 2. Williton; Blue Anchor. 3. N. Curry; Durston; W. Monkton. 9. Berrow; Uphill; Bleadon.

Melilotus officinalis Lam. 4. Staple Fitzpaine. 5. Borders of Beer Wood, Aller.

Trifolium subterraneum L. 3. Locally plentiful in pastures, W. Monkton; abundant near Aisholt, Rev. J. A. G. Cooper.—*T. medium* L. 4. Staple Common (borders).—*T. squamosum* L. 9. Uphill; dwarfed on a dry limestone hillock, very fine in a salt marsh below.—*T. striatum* L. 3. In several pastures about W. Monkton. 9. Uphill.—*T. scabrum* L. 2. Minehead Warren; shore near Williton. 9. Uphill.—*T. glomeratum* L. 3. In two stony pastures near W. Monkton, about half a mile apart, fairly plentiful. This is the first localized Somerset record. I searched twice for it in vain on Minehead Warren, a very suitable spot.—**T. suffocatum* L. 2. Minehead Warren, in good quantity. It is quite likely to have grown formerly, as alleged, on the Strand, Weston-super-Mare, before so much building took place. Confirms the species for Somerset.—*T. filiforme* L. 2. Minehead Warren. 3. W. Monkton; Thurloxtan. 9. Brean Down, sparingly.

Astragalus glycyphyllos L. 5. Edge of Beer Wood, Aller.

Ornithopus perpusillus L. 2. Scarce and dwarf on Minehead Warren. 3. Beacon Top, near W. Monkton.

Hippocrepis comosa L. 9. Uphill.

Vicia hirsuta Gray. 1. Between E. Anstey and Brushford. 2. Dunster; Williton.—*V. angustifolia* L. 1. E. Anstey to Brushford. 2. Stogumber; Williton; Washford; Minehead. 3. Thurloxtan; W. Monkton. 9. Brean Down; Uphill. In all these cases only the type (*segetalis*) was observed.—*V. bithynica* L. 2. Railway-banks, Washford. 3. Wiveliscombe, L. Riley sp.

Prunus insititia Huds. 9. Near Bleadon.

Spiræa Filipendula L. 9. Purn Hill; Bleadon Hill; Crook Peak.

Rubus Idæus L. 6. Between Castle Neroche and Blackwater.—*R. pulcherrimus* Neuman. 4. Staple Common. 6. South of Castle Neroche.—*R. corylifolius* Sm. var. *cyclophyllus* Lindeb. 2. Coast near Dunster.

Potentilla verna L. 9. Bushy ground, between Loxton and Bleadon; very local indeed, but in fair quantity.—*P. procumbens* L. 1. Near E. Anstey; also *P. procumbens* × *silvestris*.

Alchemilla vulgaris L. var. *filicaulis* (Buser). 1. Plentiful in pastures, &c., between E. Anstey and Brushford. N.B. *A. arvensis* L. ascends to the top of Crook Peak; such situations prove it to be no mere "weed of cultivation."

Poterium Sanguisorba L. 2. Williton. 3. W. Hatch. 4. Staple Fitzpaine. Doubtless common enough in West Somerset wherever the soil is calcareous.

Rosa micrantha Sm. 2. Williton; Blue Anchor. 9. Compton Bishop.

Pyrus torminalis Ehrh. 3. Kingston.—*P. Malus* L. a. *acerba*

DC. 3. W. Monkton, very rare. — *b. mitis* Wallr. 1. Near E. Anstey. 2. Blue Anchor. 5. Aller.

Chrysosplenium oppositifolium L. 3. W. Monkton.

Drosera rotundifolia L. 1. Moors between E. Anstey and Brushford. 6. Boggy ground south of Castle Neroche.

Myriophyllum spicatum L. 2. Pool and ditches near Minehead Warren. The plant mentioned in Fl. Som. as growing in the rivers Exe and Barle is pretty sure to be *M. alterniflorum*, a characteristic species of swift streams in hilly districts, and much more general, inland, than the other.

Callitriche hamulata Kuetz. 3. Pond at W. Monkton Rectory. — *C. obtusangula* Le Gall. 9. Uphill; below Brean Down, in ditches.

Epilobium angustifolium L. 2. A large patch close to the railway station, Dunster. — **E. montanum* × *obscurum*. 3. Roadside between W. Monkton and Kingston. — **E. lanceolatum* Seb. & Maur. 3. W. Monkton; very scarce. — *E. adnatum* Griseb. 3. Cultivated ground at Bathpool, W. Monkton. — **E. obscurum* × *parviflorum*. 3. W. Monkton, in two localities.

Enothera biennis L. 2. Waste ground by Dunster Station.

Hydrocotyle vulgaris L. 1. Between E. Anstey and Brushford. 4. Staple Common. 6. South of Castle Neroche.

Smyrnium Olusatrum L. 5. Aller. 9. Bleadon. Clearly a relic of cultivation in both cases; but I think that it is native on the cliffs west of Watchet, district 2.

Sison Amomum L. 2. Watchet. 3. W. Monkton. 5. Aller. 8. Wells, 1882-3. 9. Bleadon.

Sium erectum Huds. 9. Uphill.

Ægopodium Podagraria L. 1. Brushford. I have never seen this truly native in Britain.

Pimpinella Saxifraga L. var. *dissecta* With. 3. Roadside near Gotton, W. Monkton.

Ænanthe pimpinelloides L. 3. W. Monkton; frequent. 5. Aller. — *Æ. Phellandrium* Lam. 9. Uphill.

Caucalis nodosa Scop. 2. Coast near Williton. 9. Bleadon.

Viburnum Opulus L. 1. Brushford. 4. Castle Neroche.

Rubia peregrina L. 2. Williton; Watchet. 3. Thurlbear; W. Monkton. 5. Aller.

Galium palustre L. var. *Witheringii* (Sm.). 3. W. Monkton.

Asperula odorata L. 5. Beer Wood, Aller.

Sherardia arvensis L. This grows on limestone hills and maritime sands, as well as in cultivated ground and "waste places."

Valeriana dioica L. 4. Borders of Staple Common. 6. Between Castle Neroche and Blackwater. — *V. Mikanii* Syme. 10. Plentiful among bushes on limestone near Warleigh.

Scabiosa Columbaria L. 9. Bleadon; Uphill.

Erigeron acre L. 8. Old walls at Wells, 1882, 1905.

Filago germanica L. 2. Coast below Dunster. 3. W. Monkton. 9. Compton Bishop.

Anaphalis margaritacea Benth. & Hook. fil. 1. Railway-bank between E. Anstey and Brushford; an escape.

Gnaphalium uliginosum L. 3. W. Monkton.

Inula Conyza DC. 3. W. Monkton. 5. Aller. 9. Bleadon.

Anthemis arvensis L. 3. W. Monkton.—*A. nobilis* L. 4. Staple Common.

Chrysanthemum Parthenium Pers. 2. Washford, &c.; common.

Artemisia vulgaris L. 2. Minehead (type and var. *coarctata* Forselles); Williton. 9. Brean.

Petasites officinalis Moench. 2. Crowcombe; Stogumber; Williton. Common by streams, &c.

Senecio sylvaticus L. 3. W. Monkton.

Carlina vulgaris L. 2. St. Audries; Williton; Blue Anchor. 3. W. Hatch. 5. Aller. 8. Dulcot Hill, Dinder, 1882. 9. Brean Down; Uphill; Bleadon; Compton Bishop.

Carduus pycnocephalus L. 2. Coast near Williton.—*C. crispus* L. 2. Dunster.

Cnicus eriophorus Roth. 9. Brean Down, in good quantity.—*C. acaulis* Willd. 3. Scarce, on the cricket-field, W. Monkton. 5. Aller. 9. Uphill; Compton Bishop.

Mariana lactea Hill. 2. A few plants near the entrance to Minehead Warren. 5. Pasture between Langport and Aller. 9. Abundant last year on Brean Down near the farm, from whence it may have escaped originally, having quite the appearance of a native.

Serratula tinctoria L. 1. Near E. Anstey. 4. Staple Common.

Picris hieracioides L. 4. Staple Fitzpaine. 5. Langport.—*P. echinoides* L. 2. Williton. 5. Aller.

Crepis taraxacifolia Thuill. 2. Minehead; Watchet. 3. Taunton; Norton Fitzwarren. 5. Between Langport and Aller. 9. Uphill. 10. Bathampton. Evidently spreading fast.

Hieracium Pilosella L. var. **concinatum* F. J. Hanb. 2. Minehead Warren; stolons rather long, but this is merely a question of luxuriance. 9. Brean Down, together with the type.

Leontodon hirtus L. 3. W. Monkton; apparently scarce.

Taraxacum palustre DC. 1. Frequent and typical between E. Anstey and Brushford. — Subsp. *T. udum* Jord. 2. Minehead Warren (flowering on March 21st); Williton. 3. W. Monkton; W. Stoke. 5. Aller. 8. Burnham. 9. Crook Peak, up to 500 ft.; Brean Down. 10. Monkton Farleigh Hill. New record for Somerset, but probably common.

Erica Tetralix L. 2. Crowcombe Heathfield. 4. Staple Common.

Armeria maritima Willd. 9. Uphill.

Hottonia palustris L. 5. Langport; between Othery and Borough Bridge in plenty.

Primula acaulis $\times$ *veris*. 3. W. Monkton. 8. Hills south of Wells; frequent, 1883.

Lysimachia nemorum L. 1. Near E. Anstey and Brushford. 4. Staple Common, &c. 6. Between Castle Neroche and Blackwater.

Anagallis tenella L. 1. Near E. Anstey. 6. South of Castle Nerochê.

Ligustrum vulgare L. 2. St. Audries; Blue Anchor; Dunster. 4. Staple Fitzpaine. 5. Aller. 9. Brean Down. I consider it to be native in all these stations.

Vinca minor L. 3. Near Pitminster, looking truly wild.

Blackstonia perfoliata Huds. 2. Williton. 5. Aller. 9. Uphill.

Erythraea Centaurium Pers. 2. Coast below Dunster; Blue Anchor. 5. Aller. — *E. pulchella* Fr. 8. Sparingly on Tor Hill, Wells, 1883.

Gentiana Amarella L. 2. St. Audries. 8. Wells, 1883. 9. Wookey, 1882.

Menyanthes trifoliata L. 1. Bog, east of E. Anstey.

Cynoglossum officinale L. 2. Williton; Blue Anchor. 5. Aller.

Anchusa sempervirens L. 3. Thurloxtton.

Lycopsis arvensis L. 2. Crowcombe. On Brean Down and some other parts of the coast I fully believe this to be indigenous.

Myosotis palustris Relh. 1. Between E. Anstey and Brushford; var. *strigulosa*, I believe, rather than the type, but no specimen was preserved. *M. repens* G. Don is frequent in boggy ground thereabouts. — **M. sylvatica* Hoffm. 1. Bushy banks of the Barle, near Dulverton. First satisfactory record for the county; in Fl. Som. it is placed among "excluded species." — *M. collina* Hoffm. 5. Between Langport and Aller. 9. Bleadon; Compton Bishop. — *M. versicolor* Reichb. 2. Minehead Warren. 3. W. Monkton. 9. Brean Down.

Lithospermum purpureo-cæruleum L. 5. Borders of woods, bushy places and hedges about Aller, in profusion; extending at intervals over fully a mile. — *L. officinale* L. 2. Wooded cliffs near Blue Anchor, in small quantity.

Verbascum Thapsus L. 2. Dunster. 3. W. Monkton. — *V. virgatum* Stokes. 3. Roadside in W. Monkton parish; only a few plants, not native.

Veronica officinalis L. 4. Staple Common. — *V. montana* L. 3. W. Monkton. 4. Staple Common (wooded borders). 5. High Ham. — *V. Anagallis-aquatica* L. 3. Ditches between Bathpool and Rowbarton.

**Euphrasia Rostkiana* Hayne. 4. Staple Common. — **E. curta* Fr. var. *glabrescens* Wettst. 9. Plentiful, but very dwarf, on the grassy ridge of Brean Down.

Pedicularis palustris L. and *P. sylvatica* L. 1. Between E. Anstey and Brushford. 4. Staple Common.

Origanum vulgare L. 5. Aller. 9. Bleadon.

Thymus Chamædryas Fr. 4. Staple Fitzpaine.

Calamintha officinalis Moench. W. Monkton; scarce. 9. Bleadon; Uphill.

Melissa officinalis L. 3. Lane near W. Monkton Church; only one plant, escaped.

Salvia Verbenaca L. 2. Blue Anchor. 5. Aller. 9. Bleadon.

Nepeta Cataria L. 4. Hedge-border of the cricket-ground, Staple Fitzpaine.

Stachys Betonica Benth. 1. Near E. Anstey.

Lamium Galeobdolon Crantz. 1. Brushford. 3. W. Monkton. 5. Aller.

Plantago Coronopus L. 2. Minehead; Blue Anchor; Williton. 3. W. Monkton, rare. 9. Bleadon.

Chenopodium polyspermum L. 3. W. Monkton; a weed in garden ground, and sparingly in an oat-field.—*C. album* L. var. *viride* Syme. 2. Minehead. 3. W. Monkton.

Beta maritima L. 2. Coast near Williton.

Polygonum Raii Bab. 2. Coast below Dunster; abundant over a very small area.—*P. amphibium* L. 2. Williton.

Rumex Hydrolapathum Huds. 3. Lyng. 5. Othery.

Daphne Laureola L. 3. Durston; scarce. 5. Aller. 9. Wood between Loxton and Bleadon.

Viscum album L. 3. Plentiful at W. Monkton. 5. Aller.

Euphorbia amygdaloides L. 5. Aller. 9. Bleadon.

Ulmus montana Stokes. 5. Beer Wood, Aller; native.

Urtica urens L. 3. W. Monkton. 9. Brean.

Parietaria officinalis L. 2. Minehead; Dunster; Williton. 3. Cheddon Fitzpaine; W. Monkton; N. Curry. 9. Brean Down; Berrow.

Carpinus Betulus L. 3. Burlinch Wood, W. Monkton, and by a streamlet north of it; probably planted.

Salix aurita L. 1. Frequent in swampy ground between E. Anstey and Brushford. 4. Staple Common.—*S. repens* L. 1. E. Anstey to Brushford. 4. Staple Common.—*S. purpurea* L. 2. Coast below Dunster, near the east end of Minehead Warren. Here it forms a considerable thicket; both sexes are present, and I think that it is truly wild.

Populus canescens Sm. (*P. alba* × *tremula*). 9. Roadside between Loxton and Bleadon; planted.

Cephalanthera pallens Rich. 10. Monkton Farleigh Hill (just within the county), 1904.

Orchis maculata L. *subsp. *O. ericetorum* Linton. 1. Plentiful between E. Anstey and Brushford. 4. Staple Common. 6. South of Castle Neroche. First notice for this segregate in Somerset, I believe; it was not yet described when Fl. Som. was published, but will certainly prove to be frequent. As early as 1879 I was struck by the marked difference between the chalk-down plant and that of heaths and swampy meadows. On the whole, it appears to me to deserve full specific rank; so far as my own observations go, it is as decidedly "calcifuge," as restricted *O. maculata* is "calcicole."

Ophrys apifera Huds. 4. Staple Fitzpaine. 9. Bleadon.

Habenaria conopsea Benth. 4. Sparingly in a wet upland pasture near Staple Common. 9. Mendip slopes above Draycott, 1883.—

H. bifolia R. Br. 4. Staple Common. 5. Near High Ham. 6. South of Castle Neroche.—*H. chloroleuca* Ridley. 2. Rough ground above the cliffs, St. Audries, abundant; Watchet.

Iris foetidissima L. 2. Very plentiful about Williton and Washford. 3. Thurlbear; W. Monkton—perhaps originally planted here. 5. Aller. 9. Sand-hills, Berrow, abundant; Uphill, Bleadon, &c.

Narcissus Pseudo-narcissus L. 3. In profusion about Pitminster; meadows near Norton Fitzwarren; W. Monkton, very local.—*N. biflorus* Curt. 2. A few plants outside the wood at St. Audries; not native.

Ruscus aculeatus L. 9. Hedge on Mendip, above Axbridge, 1883.

Allium vineale L. 3. W. Monkton; uncommon.

Narthecium Ossifragum Huds. 6. Bogs south of Castle Neroche.

Juncus Gerardi Lois. 2. Wet ground at the east end of Minehead Warren.—*J. supinus* Moench. 1. Near E. Anstey.

Luzula erecta Desv. 1. Between E. Anstey and Brushford. 4. Staple Common. 6. Between Castle Neroche and Blackwater.

Typha latifolia L. 2. Near Dunster. 3. Thurlbear; Bathpool. 5. Othery.

Lemna trisulca L. and *L. polyrrhiza* L. 9. Uphill, in a pond near the station.

Triglochin maritimum L. 9. Uphill.

Potamogeton natans L. 3. Pond at Norton Fitzwarren.—*P. polygonifolius* Pourr. 1. Near E. Anstey.—*P. crispus* L. 2. Williton. 3. W. Monkton. 9. Uphill.—*P. pusillus* L. 3. Pond at Walford, W. Monkton.

Zannichellia pedicellata Fr. 9. Pool below Brean Down; very characteristic.

Scirpus sylvaticus L. 1. Between E. Anstey and Brushford, in plenty.

Eriophorum angustifolium Roth. 1. E. Anstey to Brushford. 4. Staple Common. 6. South of Castle Neroche.

Carex pulicaris L. 1. Near E. Anstey. 4. Staple Common. 6. Between Castle Neroche and Blackwater.—*C. paniculata* L. 1. Between E. Anstey and Brushford. 2. Crowcombe Heathfield, &c.; common in this valley. 6. South of Castle Neroche.—*C. muricata* L. 2. A large plant (Reference No. 2925), bearing numerous flowering stems with subdistant spikelets, which I found near Dunster Station, and took to be a strong form or variety of this species, Mr. Druce considers to come near *C. Pairæi* F. Schultz, lately discovered by him in W. Cornwall. Not having seen either specimens or a description of that segregate, I cannot at present form a valid opinion, but hope to gather the sedge again.—*C. divulsa* Good. 3. W. Monkton.—*C. stellulata* Good. 1. Bogs near E. Anstey. 4. Staple Common. 6. South of Castle Neroche.—*C. remota* × *vuipina*. 3. Lane near Sidbrook, W. Monkton, with the parents. I believe that this hybrid, rather than *C. muricata* × *remota*, is *C. axillaris* Good.; at any rate, nearly all the specimens of “*axillaris*” that I have seen have this origin.—*C. Goodenowii* J. Gay. 1. Between E. Anstey and Brushford. 5. Between Othery and Borough Bridge.—*C. pallescens* L. 1. Between E. Anstey and Brushford. 4. Staple Common.—*C. panicea* L. 1. Plentiful between E. Anstey and Brushford—both type and var. *tumidula* Laest. were noted. 4. Staple Common. 6. Between Castle Neroche and Blackwater.—*C. pendula* Huds. 3. Pitminster; Thurlbear; Durston.—*C. laevigata* Sm. 1. Near E. Anstey. 6. South of Castle Neroche.—*C. binervis* Sm. 4. Staple Common. 6. Near Castle Neroche.—*C. distans* L. 2. Near the east end of Minehead Warren. 9. Salt marsh below Brean Down.—*C. Hornschuchiana* Hoppe. 1. Near E. Anstey, associated with *C. Hornschuchiana* × *(Ederi* var. *ado-*

carpa, which is probably *C. fulva* Good. 4. Staple Common. 6. Between Castle Neroche and Blackwater. — *C. (Ederi)* Retz var. *ædocarpa* And. (the "*C. flava* var. *Ederi* Liljeblad" of Fl. Som.). 1. Between E. Anstey and Brushford. 4. Staple Common. 6. Near Castle Neroche. — *C. hirta* L. 4. Staple Common. 9. Berrow. I fancy that the popular name "carnation grass," referred to this in Fl. Som., applies rather to *C. flacca* (*glaucæ*), which is so called in Wilts and Gloster. — *C. Pseudo-cyperus* L. 3. Hyde, Bathpool. — *C. acutiformis* Ehrh. (*paludosa* Good.). 2. Minehead. 3. Lyng; Thurlbear; W. Monkton; Cheddon Fitzpaine. 5. Othery; Borough Bridge. 9. Loxton. — *C. riparia* L. 3. Lyng. A peculiar form or monstrosity, growing from two to three feet high, the female spikelets being male in one-half to one-third of their upper part, and sometimes having one to three small male spikelets at their base, was found in considerable quantity in ditches near the canal, about midway between Bathpool and Rowbarton. 5. Plentiful about Othery and Borough Bridge. Much less general in South-west Somerset than the preceding species, I believe.

Milium effusum L. 3. Woods near Clavelshay, N. Petherton. 5. Beer Wood, Aller.

Phleum pratense L. var. *nodosum* (L.). 3. W. Monkton.

Agrostis canina L. 4. Staple Common.

Calamagrostis epigeios Roth. 2. St. Audries; locally abundant. 9. Wood-border between Loxton and Bleadon.

Aira præcox L. 2. Minehead Warren. 3. W. Monkton. 4. Castle Neroche.

Holcus mollis L. 1. E. Anstey to Brushford; frequent. 3. W. Monkton. 4. Castle Neroche, &c.

Avena pratensis L. 9. Uphill. — *A. fatua* L. 3. W. Monkton.

Arrhenatherum avenaceum Beauv. var. *nodosum* Reichb. 3. W. Monkton.

Sieglingia decumbens Bernh. 6. Between Castle Neroche and Blackwater.

Melica uniflora Retz. 1. Between E. Anstey and Brushford. 3. W. Monkton. 4. Staple Fitzpaine.

Poa compressa L. 3. Wall at Monkton Heathfield. — *P. trivialis* L. var. *glabra* Doell. 3. W. Monkton. 9. Uphill.

Glyceria fluitans × *plicata* (*G. pedicellata* Towns.). 3. Coombe and Bathpool, W. Monkton. 9. Uphill. — *G. plicata* Fr. 1. Between E. Anstey and Brushford. 2. Williton. 3. W. Monkton; Thurlbear. 9. Uphill.

"*Festuca loliacea* Huds." of Fl. Som. should be called *F. rottbœllioides* Kunth; it was Hudson's *Poa loliacea*. — *F. Myuros* L. 3. On old walls at Quantock Farm, Monkton Heathfield, and Bathpool, W. Monkton. — *F. sciuroides* Roth. 2. Minehead Warren. 3. W. Monkton; Cheddon Fitzpaine; Kingston. — **F. ovina* L. var. *capillata* Hackel (*F. tenuifolia* Sibth.). 4. Staple Common; abundant. Not previously recorded for Somerset, but doubtless frequent on moorlands. The "*F. fallax* Thuill." of Fl. Som. follows an error of Lond. Cat. ed. 8; it should stand as *F. rubra* L. (*genuina* Hackel), of which var. *fallax* Hackel (*F. fallax* Thuill.) is a variety

or subspecies. Whether the "*F. rubra*" of Fl. Som. is really different remains to be seen.—*F. elatior* L. 3. Bathpool.

Bromus mollis L. var. *glabratus* Doell (*glabrescens* Coss. & Germ.).

2. Minehead.

Nardus stricta L. 1. Brushford. 4. Staple Common.

Hordeum secalinum Schreb. 2. Minehead.—*H. murinum* L. 2. Plants found on Minehead Warren agree with the description of var. *arenarium* Bab., but shade off into the type.

Lomaria Spicant Desv. 1. Frequent about E. Anstey and Brushford. 3. W. Monkton. 4. Staple Common. 6. South of Castle Neroche.

Polystichum aculeatum Roth. 3. W. Monkton, local; *P. angulare* Presl is abundant.

Lastræa Oreopteris Presl. 4. Staple Common.—*L. Filix-mas* Presl var. *paleacea* Moore. 5. Beer Wood, Aller.

Equisetum maximum Lam. 2. Williton. 4. Common about Castle Neroche.—*E. sylvaticum* L. 4. On and near Staple Common; locally plentiful.—*E. palustre* L. 4. Staple Common. 9. Weston-super-Mare.—**E. litorale* Kuhl. 1. In a pool or back-water about six to twelve inches deep in the rocky bed of the Barle, half a mile above Dulverton Station. Just like the Surrey plant discovered by Mr. Beeby, in the only British station hitherto known. When I found it (May 31st) no "fertile stems" were present. I have hardly any doubt that it is *E. arvense* × *limosum*, which Focke (*l. c.* p. 426) says "is a very widely spread and fairly frequent hybrid." When fresh it had a great look of *E. arvense*; but that species never, I think, actually grows in water. Rev. R. P. Murray writes:—"Your hybrid *Equisetum* is interesting, and seems to me quite like Beeby's plant." Major Wolley-Dod comments on it as follows:—"Does not the absence of internal tissue and the smoothness of this plant prove its hybridity between *E. arvense* and *limosum*; that is, taking its other points into consideration?"

Chara fragilis Desv. 3. Small pond in the kitchen-garden at W. Monkton Rectory.

PLANTAGO LANCEOLATA VAR. SPHÆROSTACHYA.

By C. E. SALMON, F.L.S.

THE receipt of a few specimens of a *Plantago*, clearly allied to *lanceolata*, sent by the Rev. C. H. Waddell, who gathered them in 1904 on the downs above Lewes, Sussex, caused me to examine the varieties of this species preserved in the National Herbarium at South Kensington.

The plant in question proved to be a well-known form or variety, recognized as British in Ray's time, but now apparently ignored in our Floras. It is the *P. lanceolata* β of Linnæus (*Sp. Plant.* ed. i. 114, 1753)—"*plantago trinervia, folio angustissimo. Bauh. pin. 189, prodr. 98.*" It is also the *P. montana* Huds. (non Lam.), with

the following diagnosis found in his *Fl. Anglica*, 53, 1762:—"P. foliis lineari-lanceolatis basi lanatis, spica subrotunda, scapo tereti. *Plantago alpina angustifolia*. *Bauh. hist.* iii. 506; *R. Syn.* 315. *Anglis*, Mountain-plantain. Habitat in rupibus Trivyldaugh supra lacum Llyn Bochlyn Sancti Parisii; *D. Lhwyd—R. Syn.*"

In Herb. Banks at Brit. Mus. specimens exist labelled "Llanberris. Aug. 1773. Above Llyn Bochlin, a lake on the side of Glyder, exactly where Mr. Lloyd found it.—see *Raii Syn.* edit. 3. p. 315. 9."; and the plants are named "*P. montana*, Huds. *lanceolata* β, Linn." These were collected by Banks during his visit to Wales in company with Lightfoot, of which the latter's account was published in this *Journal* for 1905 (pp. 290-307). The plant is mentioned (as *P. montana*) on p. 304, where Mr. Riddelsdell queries the name of the lake as "Llyn Bochlwyd." Lightfoot adds a note: "N.B. This is no other than a variety of *Plantago lanceolata* with a round head." Ray included the plant in his first edition (1690, p. 126), but was doubtful as to its identity with Bauhin's *P. alpina angustifolia*; in the third edition Dillenius, who may have seen the plant on his visit to Snowdon, gives the following note upon it: "Plantam hanc e rupibus Trigvylclaugh [*sic*] orientem spectantibus in hortum nostrum intuli, ubi jam vivet; *D. Richardson*. Plantagini marinæ *Ger.* tam similis est ut distingui nequeat. Spica saltem gracilior est, quod loci conditioni procul dubio debetur."

On the Continent the plant has had the following names and descriptions:—

"*P. lanceolata*, var. ε, foliis angustis subhirsutis, basi hirsutissimus, spicis subglobosis. *P. lanceolata*, *A. Poir. Dict.* 5, p. 372." (De Candolle, *Fl. Fr.* vol. v. (vi.), 377, 1815.)

"*P. lanceolata*. L. γ *sphærostachya*." Whole plant small, leaves spread out in a rosette, flat on the ground, narrow, only 3-nerved, smooth or somewhat shaggy, the bearding at the base of the same long, scape slender, spike small, almost globular. In dry and barren meadows. (*Röhlings, Deutschl. Fl.* i. 803, 1823.)

"*P. lanceolata* L. β *capitellata*. foliis angustis subhirsutis basi hirsutissimis, scapis digitalibus, spica subsphærica: *P. lanceolata* γ *sphærostachya* D. fl. l. c. *P. lanceolata* ε DC. l. c. Occurrit quoque scapis fere pedalis, foliis formæ vulgaris: *P. lanceolata* var. *capitellata* Sonder in litt." (*Koch, Syn. Fl. Germ. et Helvet.* ed. 3, i. 516, 1857.)

"*P. lanceolata*, L. δ. *P. capitata*, Ten.; (var. *capitellata*, Koch.) Forme naine, à feuilles étroites, entières, ord^t laineuses à la base; épis subglobuleux." (*Corbière, Nouv. Fl. de Normandie*, 483, 1894.)

The descriptions given above well describe the plant, which seems easily discernible from the type by its smaller and more delicate growth, slender scapes, shorter and narrower 3-veined leaves with white silky hairs at their base, and subglobular heads.

Besides the Sussex and Welsh specimens already mentioned, I have seen examples of this variety from "mountain pastures above Cave Hill [Belfast], July, 1846"; "St. Aubin, Jersey. Aug. 1842"; "St. Martins, Guernsey, 1841." All these are in the National

Herbarium from Newbould's herbarium. The name of the collector of the Belfast specimen is illegible, but the ticket is in Syme's hand: the Channel Islands specimens are named "var. *sphaerostachya*" by Newbould, who collected them. The plant—which should bear the name *Plantago lanceolata* L., var. *sphaerostachya* Röhlings—will doubtless be found in other herbaria.

REPRESENTATION OF GEOGRAPHICAL DISTRIBUTION.

By R. LLOYD PRAEGER.

WHEN one is studying or comparing the distribution of plants or animals in these islands, a list of the areas in which a species occurs, such as is given in Watson's *Topographical Botany*, the Conchological Society's *Census*, or *Cybele Hibernica* is not sufficient. While the numbers or names convey a general idea to the mind, they leave no definite pictorial impression, and for actual comparison of two distributions we must have recourse to a map, on which we mark the areas in which each species is found.

Similarly, when we come to publish a paper dealing with such problems, the pictorial representation of distribution is very desirable for the sake of clearness, but the trouble and expense of preparing drawings and then process-blocks are practical considerations not to be overlooked. And this expense, be it noted, is all additional to the compositor's price per page, for the printer, as all editors know, makes no allowance for the space occupied by illustrations. These considerations lead me to suggest the following plan, which will in most cases serve sufficiently well the purpose stated, and by which the expense referred to above may be practically eliminated.

Let us take Watson's map of Great Britain, divided into one hundred and twelve vice-counties, with the number which has been given to each vice-county written in the centre of the area to which it refers. Impose upon this a series of small squares, of such a size that the number of squares occupied or mainly occupied by land surface is the same as the total number of vice-counties. Then shift the numbers so that each will fill one of the squares, still preserving their relative positions as far as possible. While the greater part of Watson's map lends itself sufficiently well to such an operation, the agglomeration of small counties in North Wales and the East Lowlands tends to distort the positions of the numbers there, when each is allotted an area equal to the average. Ireland presents no difficulty as regards the same process. The average area of the forty Irish divisions proposed by myself is almost identical with the average in Great Britain, and the respective divisions exhibit no such extreme diversity of size as exists, for instance, between Flint and Salop.

If we now eliminate the lines of the map and the system of squares, we have left a series of numerals arranged in horizontal

and vertical lines, which present no difficulty to the compositor, and may be set up almost as easily as ordinary type. (Fig. 1.)

112											
111											
110				08 07 09							
				05 06 95 94							
04				96 92 93							
03				97 88 89 91							
				98 99 87 90							
02				76 86 85							
				01 84 83 82							
				00 75 77 81							
				78 79 80 68							
35 34 40 39				74 73 72 70 67							
33 36 37 38				69 65 66.							
27 28 29 32				71 60 64 62							
26 25 30 31				59 57 63 61							
16 17 24 23 22				52 49 50 51 58 54							
15 18 19 21				48 47 40 39 56							
9 10 14 13 20				46 43 38 55 53 28 27							
2 8 7 11 12				42 36 37 32 30 29 26 25							
1 4 5 6				45 44 33 23 24 31 20 19							
3				41 35 34 7 22 21 18							
				6 8 12 17 16 15							
				4 5 9 11 13 14							
1 2 3				10							

FIG. 1.

Examination will show that not only the general outlines of the country, but the relative positions of the vice-counties are preserved better than might have been anticipated. It is possible that some botanist having a fuller acquaintance than I enjoy with the flora and topography of England and Scotland may be able to improve on the arrangement of some of the vice-counties as given above. To exhibit the range of an organism according to this plan, I suggest the use of heavy-face type for "present," and ordinary type for "absent." This is better than using a dash or a blank

for "absent," since it is often quite as important to specify definitely the areas in which a plant or animal does not exist as those in which it occurs.

In many cases, especially where large areas are being dealt with, a less elaborate diagram will suffice. In Great Britain we have Watson's eighteen provinces to fall back upon, and also his thirty-eight vice-provinces. The eighteen provinces are too few in number to give a good pictorial effect. Also, the twelve Irish districts as proposed by Babington and used in *Cybele Hibernica* approach in area more closely to the vice-provinces than to the provinces. The vice-provinces therefore are preferable for use—

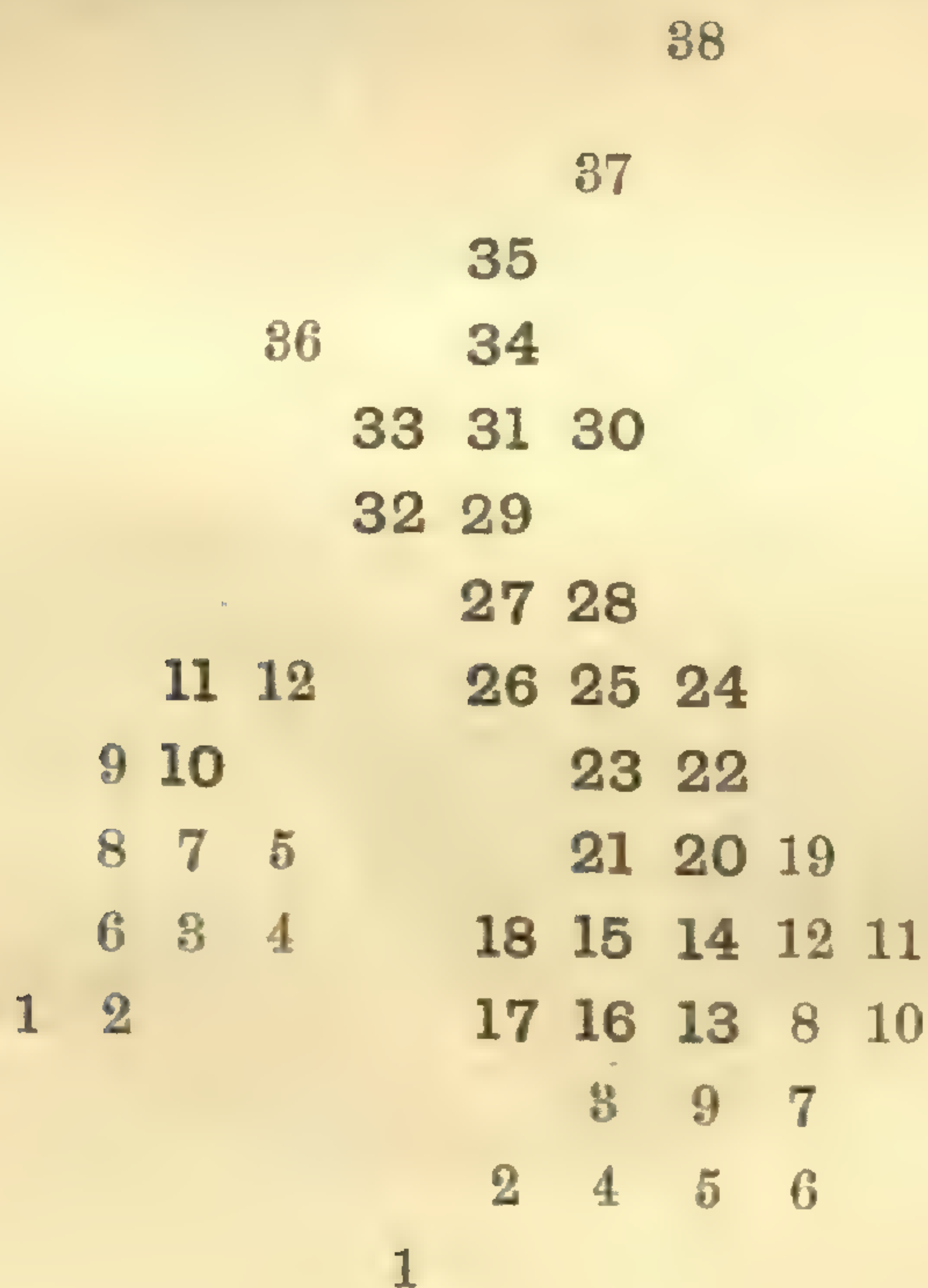


FIG. 2.

and they combine with the Irish districts to form an excellent diagram. This is seen in fig. 2, in which also, to serve as an illustration, the range of *Trollius europæus* is shown by the use of heavy-faced type as suggested.

There is of course nothing new in the application of letters or numerals in type to express graphically geographical distribution. So long ago as 1890 Mr. P. Chalmers Mitchell* suggested a scheme on this principle for illustrating the distribution of animals in the great zoological regions of the world; but I do not find that any attempt has been made hitherto to use a method of the kind in such detail or to apply it to our own islands. The advantage of the plan, as I have said, is its ease and cheapness; by it we can, in fact, map without maps.

* "A Graphic Formula to express Geographical Distribution" (Proc. Zool. Soc. Lond. 1890, pp. 607-9).

ADDITIONS TO THE CORNISH FLORA.

BY FRED. HAMILTON DAVEY, F.L.S.

IN no one year have so many additions been made to the Cornish flora, or so many new localities been reported for rare plants, as during 1905. The following is a list of plants now recorded for the first time for the "delectable duchy." Unless otherwise stated, the localities are in Cornwall West, forming the initial number to the Watsonian vice-counties. My own records are without personal authority.

Grateful acknowledgment is here offered of kind help in the determination of some of the plants from Rev. Augustin Ley, Mr. Arthur Bennett, Mr. J. Groves, Rev. E. F. Linton, Rev. E. S. Marshall, Mr. H. W. Pugsley, Rev. W. Moyle Rogers.

Papaver Rhæas L. var. *Pryorii* Druce. Goonhavern, *W. Tresidder*; Perranporth, *J. W. Jones*; Mount Hawke, *E. Richards*; Ponsanooth.

Fumaria Boræi Jord. var. *verna* Clav. Gilly Tresamble, Perranarworthal. — Var. *muraliformis* Clav. Roadside, Praze, Penryn, *Miss J. Davey*. Roadside, Barres Moor, near Ponsanooth. — *F. confusa* Jord. var. *hibernica* Pugsley, *in litt.* Potato-fields, Ponsanooth. Scilly Isles, *Herb. F. Townsend*, teste *H. W. Pugsley*.

Polygala serpyllacea Weihe, var. *vincoides* Chodat. Wheal Clifford Downs and Carnmarth, Gwennap (see *Journal of Botany*, January, 1906, 34).

Ulex Gallii Planch. var. *humilis* Planch. Common on most hills and exposed crofts and downs. This is probably the plant which older botanists recorded for Cornwall as *U. nanus*, a species which continues to elude the search of the botanist on the mainland, though it has been found on the Scilly Isles. The habit of the variety now under notice is altogether different from that of the type. Instead of producing long, erect branches, its branches are short and decumbent, and they grow so close together that one can easily walk on the dense patches without touching the ground. In height, the plant rarely exceeds a foot. When a croft where it grows has been fired, and the furze has been burnt to the ground, the shoots which are produced the following year are absolutely prostrate, and are generally more full-flowered than the branches on older plants.

Rubus plicatus W. & N. var. *hemistemon* (P. J. Muell.). Colbiggan Down, Withiel, *C. C. Vigurs*. This locality is in v.-c. 2. — *R. lentiginosus* Lees. Frogmoor, near Ponsanooth. — *R. macrophyllus* W. & N. var. *macrophyllodes* (Genev.). Wood near Sticking Bridge, Ponsanooth. — *R. rudis* W. & N. Kennall Woods and Barres Moor, Ponsanooth; not typical. — *R. podophyllus* P. J. Muell. Cairns, Ponsanooth. — *R. horridicaulis* P. J. Muell. Hedge bordering the Cairns, Ponsanooth.

Potentilla Tormentilla Sibth. var. *sciaphila* Zimmeter. St. Columb Minor, *C. C. Vigurs*. Wheal Clifford Downs and Carnmarth,

Gwennap. On plants sent from Wheal Clifford Downs, Mr. Arthur Bennett reported: "Agree with an authentic specimen so named by Dr. Wolf, who is monographing the genus."

Drosera anglica Huds. Ventongimps Moor, Perranzabuloe, in great abundance, *W. Tresidder*. In *A Botanical Tour through various parts of the Counties of Devon and Cornwall*, by Rev. John Pike Jones (1820), this plant is recorded for Marazion Marsh. The late Dr. Ralfs and Mr. W. Curnow often expressed their conviction that *D. intermedia* had been mistaken for *D. anglica*. Mr. Tresidder's record is a most interesting one, and the wonder is that the locality has been so long overlooked.

Caucalis latifolia L. In a permanent pasture at Morval, near Looe (v.-c. 2), *Miss Boucher*.

Senecio Cineraria DC. Cliffs above Newquay Harbour, *C. C. Vigurs*. Of undoubted garden origin, but perfectly naturalized, and more or less abundant.

Crepis virens L. var. *agrestis* Koch. A striking plant, oftentimes more than three feet high, and with much larger anthodes than the type. Occurs with root crops in autumn, and appears to be widely distributed.

Leontodon autumnalis L. var. *simplex* (Duby). Among short turf on Connor Downs, between Camborne and Hayle.

Gentiana lingulata C. A. Agardh, var. *præcox* Townsend (Murbeck). Porth Towan. Chapel Porth, St. Agnes, *E. Richards*; Newquay, *C. C. Vigurs*. Discovered by myself on June 21st. By the second week in July it was impossible to find a flowering specimen, but there were thousands of gaping capsules. Several plants were found bearing pure white flowers.

Euphrasia borealis Towns. Carnkief Moor, Perranzabuloe. Probably occurs in many other places.

Mention should here be made of a handsome *Euphrasia* which I found in comparative plenty at Porth Towan, on June 21st. It is closely allied to *E. Rostkoviana*, but is less branched, less glandular, and has a larger corolla, of a deep violet colour. Fresh specimens were sent to the Rev. E. S. Marshall, who expressed the opinion that it differed from all described British forms. I have since forwarded dried specimens to Prof. Wettstein, and am awaiting his reply.

Nepeta Glechoma Benth. var. *parviflora* Benth. Quite a distinct variety, and apparently well distributed.

Galeopsis Tetrahit L. var. *bifida* (Boenn.). This variety also appears to have a wide range.

Polygonum Persicaria L. var. *prostratum* Breb. Among root crops near Ponsanooth, chiefly on a sandy granite soil.

Salix lutescens Kern. (*S. aurita* × *cinerea*). The reservoir, Mabe, near Penryn. Trevince Moor, Gwennap.

Juncus supinus Moench. var. *Kochii* (F. W. Schultz). Newquay, *C. C. Vigurs*. Mabe reservoir.

Sparganium simplex Huds. var. *longissimum* Fries. Streams on Porkellis Moor, Wendron.

THE VEGETATION OF ROTTEN PARK RESERVOIR.

By H. STUART THOMPSON, F.L.S.

ECOLOGICAL students may be interested in some notes made from 1893 to 1901 upon the vegetation of this large reservoir, situated as it is within the city of Birmingham and surrounded on three sides with houses and factories. The total enclosure comprises some seventy acres, and, as some very uncommon plants made their appearance either on the dry bed of the reservoir or upon its banks during these years, it may be of interest to put them on record.

On Sept. 21st, 1893, after the long drought of that summer, I found the vegetation on the bed of the reservoir largely composed of *Chenopodium rubrum*, a new record for the Tame division of the county of Warwick, and its prostrate form allied to the variety *pseudo-botryodes* H. C. Wats., *Nasturtium palustre*, *Gnaphalium uliginosum*, *Polygonum lapathifolium*, *P. Persicaria* var. *elatum* G. & G., and the rarer *P. maculatum* Trim. & Dyer. In less abundance were the following:—*Bidens tripartita*, *Ranunculus sceleratus*, *R. heterophyllus*, *Alopecurus geniculatus* and *A. fulvus*, *Sagittaria sagittifolia*, *Juncus lamprocarpus* and *J. bufonius*, *Sparganium simplex*, *Callitriche platycarpa*, *Littorella juncea*, hitherto recorded from only four places in Warwickshire, and *Limosella aquatica*, new to the Tame basin, and very scarce in the county altogether.

The following Saturday Mr. Bagnall accompanied me to the reservoir, and he added to the list a very rare hepatic, *Riccia crystallina*, which was quite new to the midlands. Mixed with it on the dry mud were large vivid green patches of the rare earth-moss *Physcomitrella patens* Hedw., but we failed to find any trace of the *Elatine hexandra*, which reappeared that summer at Coleshill Pool and Olton Reservoir after many years of apparent lifelessness.

In 1900, on Oct. 13th, I again visited the reservoir, which, though very low, was not so low as in 1893, and this perhaps accounted for there being no sign of *Limosella* or *Littorella*; but *Nasturtium palustre*, *Chenopodium rubrum*, *P. Persicaria* and *lapathifolium* were as luxuriant as before; and there was also a patch of the handsome *Nasturtium amphibium* at the extreme corner of the shallow end.

In 1901 I made various visits to the reservoir, and collected many fresh species. On June 26th the *Nasturtium amphibium* was a blaze of gold, *Carex ovalis* and *C. hirta* were frequent, and a sedge with very long woody stolons, half-buried in the drift, was not easy to determine, until on getting the plant in fruit later in the season it proved to be only a large and abnormal form of *C. hirta* with some of the heads compound at the base. The two common grasses, *Glyceria fluitans* and *Agropyron caninum*, were much in evidence; while, on July 14th, the scarce *Alopecurus fulvus* (seen in 1893) reappeared, and there were great patches of the handsome *Pnalaris arundinacea*, and *Glyceria aquatica* with its spear-like leaves. In many places was *Scirpus palustris*, and one good patch of *S. multi-*

caulis on the gravel at the Dulley Road side. It was new to the Taine basin, and was named for me by Mr. Bagnall. A stunted bramble growing among the trees on the reservoir bank was kindly determined *Rubus dumetorum* W. & N. by Mr. Moyle Rogers. *Potamogeton crispus* was growing in the water.

On Oct. 12th the greatly increased expanse of dry mud and gravel was covered with much the same vegetation as in 1893. Seedling plants of *Chenopodium rubrum* thickly coated the ground, and, although in flower, many of them were only an inch high. The *Polygonums* were luxuriant, and *Bidens tripartita* had extended its range. At last, on approaching the shallow and narrow end, where a small stream enters the enclosure, I came across the rare *Riccia crystallina*, and numerous small seedlings of *Limosella*, which, after very careful search, I failed to notice the previous year. Some of the *Limosella* stems seem to take root and develop fresh shoots, which must come to maturity in a very short space of time, for the whole area where this plant grows was deep in water as late as the middle of July. The two plants so common in 1893, *Nasturtium palustre* and *Gnaphalium uliginosum*, were almost absent in 1901, and a great entanglement of *Potentilla Anserina* had taken their place.

THE FLORAS OF THE "VICTORIA COUNTY HISTORIES."

Two recent contributions to the volumes now being published under the above title remind us that we have not hitherto called attention to the botanical portion of this handsome and important series of books. The contributors of this section have as a rule been judiciously selected from among those botanists who have already published a flora of the county, or who are known to be engaged upon such work. In the former case we have a complete summary of the published book, often with such additions as have occurred since its issue; in the latter, the sketch and following lists are of especial interest, as no complete flora of the county has been issued; and of this we have a notable example in Mr. Druce's contribution to the volumes dealing with Buckinghamshire. As is well known, Mr. Druce intends to complete the botanical trilogy of West Thames subprovince by adding a Flora of Buckinghamshire to those of Berkshire and Oxfordshire; but until that is printed, botanists will turn with special interest to this excellent summary, all the more because Mr. Druce has not been lavish in publishing accounts of his minute and comprehensive investigations.

Buckinghamshire, as now represented, stands second in the list of six neighbouring counties in the number of its species. Berkshire heads the list, with 903 native and 107 denizens and colonists; Buckinghamshire follows with 845 and 97; Oxfordshire runs it very close, having only one less in each division; the other counties stand respectively—Herts, 795 and 95; Middlesex, 770 and 97; Northants, 765 and 85; Beds, 762 and 85. Plants of casual occurrence are not, we understand, included in the lists. Mr. Druce

divides the county into four districts, two, Ouse and Ouzel, belonging to the Ouse; and two, Thame and Thames, to the Thames system. The names are so obviously appropriate that the danger of confusion between two so closely resembling each other must be condoned.

A comparison of Mr. Druce's contribution with that made by the Rev. F. H. Arnold to the History of Sussex suggests that the general editor of the series would have done well to have secured greater uniformity in arrangement, as well as in certain other details—for instance, the bibliographical matter which comes at the end of Mr. Druce's contribution stands first in Mr. Arnold's sketch. It would have been well, too, to have arranged for the adoption of one system of nomenclature throughout, for the benefit of those who may wish to use the volumes for comparative purposes, as well as for general consistency and convenience. The proofs, considering the importance and costliness of the work, should have been read with more care—for example, the sentence on p. 50 beginning "At the historic Salt Hill" does not end; and the paragraphing is not well done. The employment of "English names" is doubtless a concession to popular sentiment, though many of these book-fabrications are at least as unfamiliar as their Latin equivalents, but they should at least be indicated by capitals in order to distinguish them from the text—*e. g.*, we read in Mr. Druce's paper of "the beautiful sedge (*Carex pendula*) and the great horsetail (*Equisetum maximum*)"; the former adjective is merely qualifying, the latter is part of the name. We observe Mr. Druce prefers "orchid" to "orchis"; he speaks of the "bee orchid," but surely the recognized "English" form is "orchis"? At times the anglicized names are misleading to the unlearned, for whose supposed benefit they are given—*e. g.*, "the nettle *Lamium hybridum*"; the English equivalent of the genus *Lamium* is not nettle, but dead-nettle.

It would be impossible in the space at our disposal to enter into a detailed criticism of the work, or to quote the numerous passages which contain information hitherto unpublished. It is, as we have already said, of special interest as being the only account with any pretensions to completeness of the botany of an interesting county, and must cause botanists to look forward with pleasureable anticipation to the full flora, the publication of which will not, we hope, be long delayed.

We presume that the Rev. F. H. Arnold was selected as the botanical historian of Sussex on the strength of his Flora of that county, published in 1887; but that seems no reason why his essay should, as is practically the case, be confined to a *résumé* of that work. A great deal has been done of late years to increase our knowledge of Sussex plants, notably by the exertions of the Rev. E. S. Marshall and Mr. C. E. Salmon, the results of whose researches have been duly chronicled in this Journal for 1901 and 1902. We find no allusion to their papers in Mr. Arnold's sketch, nor any reference to them or their work, and, as it cannot be supposed that they are intentionally ignored, we must conclude that

Mr. Arnold has taken no pains to keep himself *au courant* with the progress of our knowledge. The consequence of course is that some of the most interesting of Sussex plants find no place; *Fumaria parviflora*, *Vicia gracilis*, *Peucedanum palustre*, *Galium anglicum*, *Cerastium pumilum*, *Utricularia neglecta*, are only a few of the additions made in the papers indicated. The same neglect mars or modifies the author's statements—e. g., *Bartsia viscosa* does not, as stated "miss West Sussex," it has been found at Pagham (Journ. Bot. 1902, 222); *Silene noctiflora* is certainly not extinct (Journ. Bot. 1901, 407).

There are, indeed, abundant indications that Mr. Arnold was not properly qualified for his task. For example, he begins his introduction by referring to Gerard's *Herball* as published in 1633; it of course appeared in 1597. He cites certain pre-Linnean names from Ray, and says, "These it would now be difficult to determine" (why?); he gives *Chamædryas spuria* as if it were the accepted name of a plant; and, in a curious sentence writes of Borrer, "As an authority on the Rubi, Rosæ and Salices, the most difficult genera in our flora, he ranks among the highest." Misprints are numerous throughout: we find "Bauxbaum's speedwell (*Veronica Bauxbaumii*)"; "S[partina] Alterni flora," "Salix pentrandra," and such names as "Kirtz" for "Kütz.," "Walton" for "Wallroth," "Dilwyn" for "Dillwyn," "Schrs." for "Sebast."

It would be easy to point out other inaccuracies—for instance, what is given as if one quotation from Gerard is from two pages widely apart; *Phyteuma orbiculare* occurs in Surrey; capitals and italics are often misapplied. But the most serious defect of the sketch is its incompleteness; the editor of the *Victoria History* would do well to consult some one well acquainted with British botany before allotting the work, and to submit the proofs to the same authority. It is sad that so handsome a series should be disfigured by the numerous typographical and other errors which at present deface it.

THE KEW "BULLETIN OF MISCELLANEOUS INFORMATION."

THE "Botanist" who wrote last year to the *Times* enquiring "Where is the *Kew Bulletin*?" (see Journ. Bot. 1905, 191) will find his question answered by the recent output—no less than four parts, representing as many volumes, having been issued, according to the Stationery Office date, during February and March. It may be well, pending the publication of a complete bibliography of the *Bulletin*, to give some indication of the contents of these.

The volume for 1900, which was announced in 1901 as "in preparation," contains—so the cover tells us—"Nos. 157-168," and thirty-two pages of letterpress, just two and a half pages to a number, and costs fourpence. It has a title-page—duly misdated 1900—all to itself, and an index which by masterly spacing extends over three pages; and the Stationery Office date is "3/1906." It can hardly be said that the result is adequate to the period of preparation; the contents include an account of "Botanical Museums

in France," as they appeared in 1899; a report of the Botanic Garden, Durban, written in 1883; notices of botanists who died in 1900, of plants presented to the Kew Herbarium in 1899, and of the number of visitors to Kew Gardens during that year; and two prefaces by the late Director. *Parturiunt montes, nascetur ridiculus mus.*

The long-delayed conclusion of the volume for 1901—"Nos. 178-180, October-December"—contains an account of *Arachis hypogæa* by Mr. Burkill and a few miscellaneous notes; nearly two pages are occupied by an account of the contents of the *Botanical Magazine* for September-November of that year. The title-page is misdated 1901, and there is nothing to indicate the real date of publication except the easily-overlooked Stationery Office imprint on the first page of the text. This costs sixpence.

"No. 2, 1905," is entirely devoted to an anonymous "Botanical Survey of the Empire," which is really an account of the genesis and development of the Colonial Floras issued in connection with the Royal Gardens, and of the official correspondence relating thereto.

Our assumption (p. 80) that the *Bulletin* actually issued in January, 1906, was misdated 1905, however natural, was, we find, erroneous; for now we have "No. 1, 1906," which once more resumes the publication of papers of botanical importance, to which indeed it is entirely devoted. The "Decades Kewenses" and "Diagnoses Africanæ" by various botanists associated with Kew, and a decade of new orchids by Mr. Rolfe, make this number a good fourpenny-worth to botanists. Internal evidence suggests that these papers contain the matter "religiously accumulated for years," to which the writer in the *Times* referred in his letter, and that the new Director has been clearing out the pigeon-holes of his predecessor; if this be so, it is to be hoped that the descriptions have been compared with those published since they were written—a remark suggested by the fact that the very first plant described—*Actinidia curridens* Dum.—had already appeared as *A. callosa* Lindl. var. *Henryi* Maxim. (Act. Hort. Petrop. xi. 36), a name which should at least have been cited as a synonym. We note that the date of collection is in no case given.

How far the present batch of issues can be said to justify the statement of the late Director that the *Bulletin* is "a continuous record of Kew work in all its aspects" must of course be matter of opinion; but we would suggest to the authorities the desirability of indicating the responsible editor of the publication.

SHORT NOTE.

SAGINA ALPINA.—In Mr. Britten's kind review of my work on George Don he comments on my omission of the remarks relating to George Don which appeared in Mr. Garry's "Notes on the Drawings for 'English Botany.'" As a matter of fact, my work was written before they appeared, or I should certainly have done so. Mr. Britten also says that the alpine *Sagina* should stand as

"*S. alpina* Don MS. ex Garry, Notes, p. 36 (1903)," but I think he has overlooked the publication in the *Journal of Botany*, 1896, p. 427, by Mr. Williams in his Revision of the British *Caryophyllaceæ*, where he gives *No. 50, *Sagina alpina* G. C. Druce in *Scottish Naturalist*, p. 177 (1884). The asterisk is prefixed to those names which differ from the ones used in the last edition of the *London Catalogue*. I certainly, when I wrote *S. alpina* E. B. 3, did not wish to say it was a distinct species, as at that time the details of botanical citation were not sufficiently appreciated by me. In fact, I wrote it as a short way of expressing *S. maritima* var. *alpina*, but it certainly stands as a specific name. Mr. Arthur Bennett kindly named it for me, but I should not now refer it to *S. maritima*, although it may be a distinct micro-species.—G. C. DRUCE.

[Mr. Druce is quite right in supposing that we overlooked Mr. Williams's reference to *S. alpina*, which however is not as he gives it—"G. C. Druce in *Scottish Naturalist*, p. 177 (1884)"—but stands as "G. C. Druce, *Ann. Scott. Nat. Hist.* (Oct. 1892)." But neither Mr. Williams nor Mr. Druce give any diagnosis; the latter's citation of the name from "E. B. 3," as we showed on p. 61, is a misquotation, and he now tells us that he quoted "*S. alpina*, E. B. 3," "as a short way of expressing *S. maritima* var. *alpina*." We must leave casuists to settle whether it "certainly stands as a specific name"; it would seem more important to know whether the plant is entitled to specific rank. Mr. Druce, although claiming for it that position in his most recent reference, does not appear in the above note to have made up his mind on the subject; it looks as if the name would be added to the number of those derelicts which encumber nomenclature and trouble monographers, and it is matter for regret that Mr. Druce did not quote Syme accurately when first calling attention to Don's plant.

We still think that some reference to Mr. Garry's notes, which began in January, 1903, might have been made in Mr. Druce's paper, published in 1904, if only in an appended note; and still more that Don's labels in the National Herbarium—which, as we have shown in the case cited, supply information which clears up points left doubtful by Mr. Druce—should have been quoted in the paper.—ED. JOURN. BOT.]

NOTICE OF BOOK.

Alien Flora of Britain. By STEPHEN TROYTE DUNN, B.A., F.L.S.
Pp. xiv, 208. London: West, Newman & Co. Price 5s.

MR. DUNN's book has appeared with a promptness which commands approval. It is but three years since his Preliminary List came out; this was noticed in this *Journal* for 1903, p. 141. In spite of many disadvantages, the author, with the help of his wife as the preface tells us, has put his ideas together in a clear and accessible form; in the introduction explaining his principles

and formulating his theory, and in the body of the work dealing with plants in detail. Both lists include not only aliens, but also many native plants which are often recorded from other than natural localities.

Botanists will be glad to have the book in their hands. It deals with a difficult problem in a courageous, if not always convincing, way. The formulation of a principle from which to start in determining the status of plants was in itself most desirable, and Mr. Dunn has foreseen the danger of applying a formula too rigidly to every case, though it is open to question whether he might not with advantage have held to it still more loosely in detail. His successors will, however, profit greatly by his work, even while they modify it.

As compared with the Preliminary List, some clear improvements may be noted in the present book. *Eschscholtzia californica*, first treated as sometimes native, is, of course, now placed among aliens. Of species which are now rightly omitted altogether, it is enough to name *Clematis Vitalba*, *Ranunculus repens*, *Draba muralis*, *Nasturtium sylvestre*, *Arenaria serpyllifolia*, *Tunica prolifera*, *Frankenia lævis*, *Euonymus europæus*, *Vicia angustifolia*, *bithynica*, and *Cracca*, *Anthemis nobilis*, *Cnicus eriophorus*. No one would require an explanation for the omission of these from the Alien List; yet they all appeared at first as only "probably natives." The change of opinion which led to the following "Aliens" of the Preliminary List being altogether omitted now is still happier, viz.:—*Draba aizoides*, *Reseda Luteola*, *Dianthus deltoides*, *Lychnis Viscaria*, *Trifolium maritimum*, *Carduus pycnocephalus*, *Asparagus officinalis*, *Lathyrus niger*, *Vicia gemella*, *Cnicus lanceolatus*, *Lolium perenne*, and others. Few will quarrel with the elevation of certain other plants from the alien to the native status; many will, indeed, desire to see some of them altogether omitted from the next edition; for assuredly no one would miss, say, *Aster Linosyris*, *Galeopsis Ladanum*, *Brassica nigra* and *oleracea*: and very few would ask after *Barbarea stricta*, *Lavatera arborea*, *Vicia lutea* and *hirsuta*, *Marrubium*, *Nepeta Cataria*, *Polypogon monspeliensis*, if they were absent.

Some other of the differences between the two lists are less easy to understand. It is, perhaps, simply an oversight that, e.g., *Triticum vulgare* no longer finds a place among aliens; but cases like those of *Aconitum Napellus* and *Verbena officinalis*, both now for the first time treated as no better than aliens, look strange against *Carex brizoides*, *Doronicum plantagineum* and *Pardalianches*, which are admitted as native. Then, again, *Helleborus foetidus*, *Diplotaxis tenuifolia*, *Epilobium angustifolium* and others do not appear in the second list, though they found a place in the first; in these we have good examples of plants whose distribution requires a very careful sifting, though all are undoubtedly sometimes native. The list, indeed, exhibits a curious unevenness in the treatment of plants; if *Ligustrum*, *Diplotaxis muralis*, *Cotyledon*, and *Fragaria chiloensis* are included in the book in one way or the other, as aliens or as natives requiring explanation, why is not some reference also made to *Fraxinus*, *Diplotaxis tenuifolia* (very frequent

as an alien, *e.g.*, about docks), *Ceterach*, and *Fragaria elatior*, cases closely allied and almost similar?

But the chief point which calls for notice is the theory propounded in the introduction. "A species is only held to be native in a natural locality to which it has spread by natural means from a natural source." In the application of this theory to details, a consideration of the immediate surroundings of a plant, as well as of its general distribution, is involved. Probably most field botanists will at once part company with Mr. Dunn in his rigid estimate of what constitutes a natural locality. According to his view, any spot altered—apparently, to any degree—by human agency ceases to be natural, and becomes artificial. Hedges, roadsides, and the like are all classed as artificial, and plants only found there, or only recorded from such situations, are treated as aliens. A queer result is that we find quite a long series of "homeless" plants, which can be assigned to no spot in the world as natives. *Brassica Sinapistrum*, *Erysimum cheiranthoides*, *Lepidium campestre*, *Sherardia*, *Anthemis Cotula*, *Solanum nigrum*, *Ajuga Chamæpitys*, *Lamium amplexicaule*, are a few of them. This suggests that something is, perhaps, wrong about the definition. Is it not this?—that a locality does not cease to be natural because it has been affected by human interference; nor does the fact that many plants are so well suited by the conditions of life in hedgerows and the like that they multiply and flourish there and hardly anywhere else, prove that they are not native there. Hedgerows, for instance, are often only a partial adaptation of wild and aboriginal groupings of shrubs, or the remains of felled woods and copses; grassy roadsides are, in many cases, untouched meadow land; ditches only a re-fashioning of natural watercourses;—in each case without any likelihood of the introduction of plants.

No apology is required for laying stress upon this matter. "Unnatural habitat" is in most cases, as Mr. Dunn remarks, the only available point by which we can test status. A great proportion of the debateable part of the book therefore rests upon it.

A second point, which recurs frequently and which is open to exception, is that of "outliers." The case of *Draba aizoides* is now treated as it should be; the plant is undoubtedly a native of Britain. But the *Cotoneaster* of the Great Orme supplies a very similar case, and it is surprising to find it placed among aliens of garden origin. The case of *Aconitum Napellus* is argued at some length and decided adversely, partly on the ground that the particular form found in Britain does not occur in the nearest parts of the Continent, while another form does. *Crepis foetida*, again, is rejected from our native flora, in spite of first-rate opinion to the contrary, chiefly upon similar grounds. But even admitting in the last case the force of what is said of its occurrence in the parts of Europe nearest Britain, yet outliers are a perfectly familiar phenomenon in botany, no less than in geology. Unaccountable gaps often occur in the distribution of plants, and far too much is made of them in the cases quoted, if the status is thereby lowered.

A third argument sometimes used by Mr. Dunn, as telling against native status, is the lateness of a first record. It is one of the two points urged against *Aconitum Napellus* as a British plant, but the fallacy often underlying it is exposed by Mr. C. E. Salmon in this Journal for 1902, p. 412. It is, I believe, of no force against the nativity of *Aconitum* in Glamorganshire.

It will be a good result of the publication of this book if it leads our field botanists to a still greater accuracy of detail in the observation of plant-habitats. Few floras exhibit so great a power of observation, and of summary statement, in this matter, as Lord de Tabley's *Flora of Cheshire*. For the stimulus which his work supplies in this direction, and for much else, great thanks are due to Mr. Dunn.

A perusal of the book leaves a general impression that its value would have been increased by a closer investigation of the least-touched and altered parts of the country. It is hardly possible that long and detailed field work, away from places where aliens congregate, would leave any doubt of the native status of *Carum segetum*, *Carduus acanthoides*, *Centaurea Calcitrapa*, and other plants in Britain. Most of all, a study of the sea coast, both sands and cliffs, especially in the West, would change Mr. Dunn's view of many plants. *Capsella Bursa-pastoris*, in a small form found also in dry spots on heaths about London and elsewhere, *Stellaria media*, abundant as var. *Boræana*, *Malva rotundifolia*, *Geranium pusillum*, *Conium maculatum* in enormous quantities and without the least claim to alien status, *Caucalis nodosa*, forming a large proportion of the turf of limestone cliffs and of the sand dunes in parts of Glamorgan, *Sherardia arvensis* and *Valerianella olitoria* in exactly the same case, *Lycopsis arvensis*, *Hyoscyamus niger*, *Solanum nigrum*, *Nepeta Cataria* in quantity about West Glamorgan, *Parietaria*,—are all cases in point. Some of these are admitted by Mr. Dunn as rare natives, but personal vouchers can be given for all of them from localities that no one could doubt, and often in the greatest profusion.

The records of *Euphorbia Characias* have some light thrown upon them in Journ. Bot. 1905, p. 306; *Holosteum umbellatum*, loc. cit. pp. 189 & 217. *Ægopodium* occurs by a wooded stream side in South Wales, a long way away from houses.

Some errors, which the author will be glad to correct in a future edition, occur. *Erysimum hieracifolium*, a "Southern European weed," is recorded by Nyman from Scandinavia, Holland, Belgium, France, Mid Europe, the Danube Provinces, South and Mid Russia. *Tetragonolobus siliquosus* should, of course, be removed from the *Cruciferae* to the *Leguminosæ*. *Arabis alpina* is unodubtedly a native of Skye. *Tilia platyphyllos* is quite native in rocky woods about the Wye above Monmouth, as well as in Wyre Forest. Dillwyn's *Fauna and Flora of Swansea* (1848) records a native locality for *Sedum sexangulare*. *Hieracium maculatum* has, within the last year or two, been discovered quite native, in a small form, on the limestone rocks of West Yorkshire, by Mr. Ley and Mr. W. R. Linton. *Atriplex patula*, with remarks, ought, apparently, to be enclosed in

brackets. And the following aliens should appear in a new edition:—*Cardamine trifolia* (B. E. C. Rep. 1903, p. 9); *Lysimachia ciliata*; *Juncus tenuis*, which requires some comment; *Linaria origanifolia* and *Scabiosa atropurpurea* (see *Flora of Kent*); *Solidago sempervirens* and *Dracocephalum thymiflorum*, both represented in the British Museum; *Polygonum cuspidatum*; *Carduus leiophyllus* and *Oenothera muricata*, which have been recently found in South Wales; *Ribes sanguineum*; *Bromus japonicus*; *Valerianella discoidea*; and others.

H. J. RIDDELSDELL.

BOOK-NOTES, NEWS, &c.

At the meeting of the Linnean Society on Feb. 15th, Mr. B. Daydon Jackson read a note on the distribution of the genus *Shortia*. It was pointed out that there were three undoubtedly good species, viz. *S. galacifolia* Torr. & Gray, *S. uniflora* Maxim., and *S. sinensis*; one doubtful species—*S. rotundifolia* Makino—from Meiaco Sima, to the east of Formosa (*Schizocodon rotundifolius* Maxim., who could not describe the flower), and *S. thibetica* Franch., which was remote from the rest, and by Bentham and Hooker, and Drude, considered with good reason to constitute a monotypic genus, *Bernieuxia*.

At the meeting of the same Society on March 1st, Dr. D. H. Scott described "A New Type of Stem from the Coal-Measures." The stem is one of the many interesting fossils obtained from the pit at Shore-Littleborough in Lancashire. The specimen was derived from one of the roof-nodules which generally represent a peculiar flora, distinct from that of the seam-nodules immediately below. Specimens of the great petioles of the same plant had been discovered a year or two before the stem itself came to light. The fragment was about 15 cm. long, and belonged to a stem of considerable size, the diameter being about 12×6.5 cm. The structure is quite distinct from that of any stem previously described. There is a single large stele, nearly 5 cm. in its greatest diameter by nearly 2 cm. in breadth. The wood is solid, without a pith, and consists throughout of pitted tracheides interspersed with bands of parenchyma. The spiral elements (protoxylem) lie at the periphery of the primary wood. Only some slight beginnings of secondary tissue-formation are shown. From the stele large and rather irregular vascular masses (meristeles) are given off, which divide up, and ultimately give rise to the numerous leaf-trace bundles; in some cases there is a previous fusion with neighbouring meristeles. The structure of the leaf-bases bears a general resemblance to that of *Myeloxylon*, the petiole of *Medullosa*. The bundles, however, are concentric, not collateral, and the petiolar structure agrees very nearly with that of *Rachiopteris Williamsoni* Seward, with which, however, the plant does not appear to be specifically identical. The new stem is referred to the family *Medulloseæ*, of which it constitutes

a unique type. It is placed in a new genus, named *Sutcliffia*, in honour of Mr. Sutcliffe, of Shore-Littleborough, and the specific name *S. insignis* is proposed for it. The structure of the genus *Sutcliffia* was further compared with that of other palæozoic stems, especially *Medullosa*, *Heterangium*, and *Megaloxylon*.

MESSRS. SCHLEICHER, of Paris, have published *Les Plantes d'Europe*, by M. Masclef, with a preface by M. Gaston Bonnier. It is an oblong volume, containing descriptions and one hundred and forty-four coloured figures, two on a plate, of the principal types of the European flora, with an introduction giving the characteristics of each order. That the figures are excellent will be evident when it is stated that they are reproduced from Sturm's *Deutschlands Flora*—a fact of which we find no mention anywhere in the book. This omission should be supplied in any future edition.

THE Country Press, of 19, Ball Street, Kensington, W., send us a series of seven postcards (price sixpence), showing the whole of the British ferns from the plates of Mr. F. G. Heath's *Fern Paradise*. They are pretty and well executed.

WE have received a book of eighty-one pages on the *Utilization of Nitrogen in Air by Plants*, which is described as the "Report for 1905 of the Agricultural Research Association, by Thomas Jamieson, Chev. F., F.I.C. Director, Glasterberry Experiment Station." In his extraordinary essay the author attempts to demonstrate that plants have the power of utilizing the nitrogen of the air through the epidermis, and especially the edges of the leaves and the hairs. The author has selected three chemical reagents to test the presence of nitrogen in the plant-cells. His experiments show ignorance of the most elementary facts in the physiology of plants, and do not in the remotest degree supply any foundation for his speculations.

WE learn from *Nature Notes* that a Flora of North-west Kent, to supplement Messrs. Hanbury and Marshall's Flora, is being compiled by "a few local naturalists." Five names, hitherto unknown to us, are appended to the announcement: "It is of course important that a printed list should be strictly accurate, and friends are therefore asked to compare notes, when possible, before sending in lists. In all cases where the least doubt is felt, the specimens themselves should be sent for verification to the Rev. A. H. Nutting, Holy Trinity Vicarage, Woolwich." The wording of the announcement does not exactly inspire us with confidence; would it not be well that some recognized authority—Mr. Marshall, for instance—should be taken into consultation with regard to critical species?

THE following bye-law has been made and sealed by the Devon County Council; it applies to the whole administrative county, except municipal boroughs, a similar bye-law of 15th Dec., 1904, applicable (experimentally) only to certain parishes in North Devon, being repealed:—"No person shall uproot or destroy any ferns or other wild plants growing in any road, lane, roadside waste, way-side bank or hedge, common, or other public place, in such a manner or in such quantities as to damage or disfigure such road,

lane, or other place, provided that this bye-law shall not apply to persons collecting specimens in small quantities for private or scientific use. Any person offending against this bye-law shall be liable to a penalty not exceeding Five Pounds."

By the death at Durham of Canon HENRY BAKER TRISTRAM, on March 8, the Church of England, says the *Standard*, "has lost one of her most learned sons, and the Evangelical party one of its most learned leaders." He was born at Eglington, Northumberland, on May 11, 1822, was educated at Durham and graduated at Oxford. Most of his life was spent in clerical work in the north, but he will be chiefly remembered by the numerous books and papers published in connection with his travels in the East. He was a leading supporter of the Palestine Exploration Fund, and contributed largely to our knowledge of the fauna and flora of the Holy Land, especially its ornithology; his only exclusively botanical paper is a note on the existence of the true *Cyperus Papyrus* in Palestine, published in the Journal of the Linnean Society (of which body he was a Fellow from 1857 to 1869) in 1865. The notice of his death in the *Daily News* is an interesting indication of the present-day estimate of relative importance: it ran—"We regret to announce the death of Canon Tristram of Durham. He was the father of the celebrated Rugby football player, and also a prominent naturalist."

DR. JAMES STEWART, who met with his death at the hands of a hostile Nigerian tribe at the end of last year, was born in Edinburgh on February 14, 1831. In 1862 he joined Livingstone's Zambesi expedition, and devoted the remainder of his life to mission work in Central Africa, where he founded various missions in connection with the Presbyterian Church. During the Livingstone expedition he made a small collection of plants, which was purchased for the National Herbarium; another small collection made by him in Zambesia in 1868-72 is in the Kew Herbarium.

MR. E. M. HOLMES, who is preparing for the "Victoria History" an account of the cryptogams of Devon and Dorset, will be glad to receive records of these, especially of fungi and freshwater algæ. Address: Ruthven, Sevenoaks, Kent.

MR. G. C. DRUCE's address will for the future be 9 Crick Road, Oxford; Mr. Arthur Bennett's is now 143 High Street, Croydon.

THE "Index Perfectus" to the first edition of Linnæus's *Species Plantarum*, issued by Baron Ferdinand von Mueller in 1880, has for some time been unattainable, and its undoubted usefulness has suggested that it should be reprinted as a Supplement to this Journal. A careful collation with the *Species* has shown that the epithet "perfectus" as applied to Mueller's compilation was a "terminological inexactitude," a considerable number of names having been omitted therefrom. In the present Index the specific names are placed alphabetically under each genus, and the arrangement will in other respects, we think, be found more convenient for reference.

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No. 521

MAY, 1906

Vol. XLIV

THE
JOURNAL OF BOTANY
BRITISH AND FOREIGN

EDITED BY

JAMES BRITTEN, K.S.G., F.L.S.

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JAMES BRITTEN, K.S.G., F.L.S.

THE JOURNAL OF BOTANY was established in 1863 by Dr. Seemann. In 1872 the editorship was assumed by Dr. Henry Trimen, who, assisted during part of the time by Mr. J. G. Baker and Mr. Spencer Moore, carried it on until the end of 1879, when he left England for Ceylon. Since then it has been in the hands of the present Editor.

Without professing to occupy the vast field of general Botany, the Journal has from its inception filled a position which, even now, is covered by no other periodical. It affords a ready and prompt medium for the publication of new discoveries, and appears regularly and punctually on the 1st of each month. While more especially concerned with systematic botany, observations of every kind are welcomed. Especial prominence has from the first been given to British botany, and it may safely be said that nothing of primary importance bearing upon this subject has remained unnoticed.

Bibliographical matters have also received and continue to receive considerable attention, and the history of many obscure publications has been elucidated. Every number contains reviews of new and important books written by competent critics: in this as in every other respect a strictly independent attitude has been maintained. While in no way officially connected with the Department of Botany of the British Museum, the Journal has from the first been controlled by those whose acquaintance with the National Herbarium has enabled them to utilize its pages for recording facts of interest and importance regarding the priceless botanical collections which the Museum contains. In 1896 it became necessary to increase the size of the Journal, owing to the number of papers sent for publication: the number of plates was at the same time augmented.

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ALABASTRA DIVERSA. — PART XIII.

BY SPENCER LE M. MOORE, B.Sc., F.L.S.

(PLATES 478, 480.)

SERTULUM MASCARENSE.

THE National Herbarium is decidedly rich in Madagascar plants. In the first place it possesses a fine set of Hilsenberg and Bojer's, the specimens often accompanied by the original labels. A collector whose plants are to be seen in this country only at the same herbarium is Vaughan Thompson (1779-1847), an army surgeon who was in Madagascar in the early part of last century, and made a considerable collection there. Some of Thompson's specimens would appear to have been communicated from this country, for, as will be noted further on, *Hypoestes Thomsoniana* Nees, founded on a plant of Thompson's gathering, is in the De Candolle Herbarium at Geneva.

In 1856 a few Madagascar plants sent home by John Forbes, the Royal Horticultural Society's unfortunate young collector, were acquired by the Trustees, together with others from Eastern Africa. The Rev. Wm. Deans Cowan's collection, made in the Ankafana and Bara districts of the island, was added to the Museum treasures in the year 1883, and a good set from the Rev. Richard Baron, numbering nearly fifteen hundred, came to hand in the period 1883-92. Besides these, there is a fine set of Hildebrandt's, acquired in 1883-4; as also a collection made by M. Cloisel at Fort Dauphin in South-east Madagascar, which has yielded several interesting novelties. More recently (1896) a set of Dr. Forsyth-Major's plants was added, containing between four and five hundred Phanerogams. And when to this list are appended the names of Chapelier, Smeathman, Boivin, Humblot, and lastly Mr. Scott-Elliott, there can be no doubt that, in an institution possessed of such spoils, the flora of Madagascar and the neighbouring Comoro Islands is excellently represented.

For further proof the present paper, the result of a few weeks' work in identifying, and where necessary describing, some of the Mascarene *Compositæ* and *Acanthaceæ*. In this, besides the four plants considered to represent new generic types, the addition to the Mascarene flora of two genera, *Cassinia* (*Compositæ*) and *Afromendonia* (*Acanthaceæ*) is now first announced, the latter genus being represented by two species certainly, while reasons are given for the belief that still a third species is a member of this rich and interesting flora.

COMPOSITÆ.

Vernonia (§ STROBOCALYX) **Cloiselii**, sp. nov. Fruticosa, arenicola, ramulis bene foliosis ut foliorum fac. inf. minutissime etsi densissime griseo-lepidoto-tomentosis, foliis parvis ovato-oblongis obtusis prope basin in petiolum sat longum lepidoto-tomentosum

attenuatis fac. sup. glandulis microscopicis nitentibus affluentissime indutis costis secundariis paucis fac. inf. difficile aspectabilibus, capitulis parvulis breviter pedunculatis 6-flosculosis in panicula corymbiformi folia subæquante dense lepidoto-tomentosa digestis, involucri subhemisphærici 4-serialis phyllis oblongis (intimis ovato-oblongis) obtusis coriaceis dorso griseo-lepidoto-tomentosis margine ciliatis interioribus gradatim longioribus, flosculis longe exsertis, achæniis nondum maturis obovoideis dense pubescentibus, pappi setis flosculis æquilongis biseriatis paucis extimis reliquis brevioribus dilute stramineis scabridis.

Hab. Fort Dauphin; *Cloisel*, 140.

Foliorum limbus 3.0–4.0 cm. $\times$ 1.0–1.5 cm.; petioli adusque 1.0 cm., sed sæpius paullo breviores. Panicula circa 3.0 cm. long. et diam. Pedunculi proprii circa 0.3 cm. long., bracteis perpaucis minimis appressis lepidoto-tomentosis onusti. Involucra 0.4 cm. long. et diam.; phylla extima 0.1 cm., intermedia 0.2 cm., intima 0.3 cm. long. Corolla adhuc inaperta 0.5 cm. long., extus glandulis minimis copiose onusta. Achænia 0.12 cm. long. et lat., pluristriata. Pappus 0.5 cm. long.

Apparently allied to *V. Grevei* Drake, a plant I have not seen, which, according to M. Drake del Castillo's description (Bull. Soc. Bot. France, xlv. 240), has oblong acute leaves, and linear-oblong acute green involucreal leaves puberulous and then glabrous.

Cassinia (RHYNEA) **comorensis**, sp. nov. Caule repente radicante ramos elongatos ascendentes dense foliosos araneoso-tomentosos emittente, foliis anguste lineari-oblongis apice brevissime basin versus longe attenuatis sessilibus utrinque dense albo-tomentosis senioribus (an annotinis?) persistentibus jam passis necnon plus minus reflexis, capitulis pro rata mediocribus heterogamis 11–12-flosculosis in cymis brevibus terminalibus sublaxis dispositis, involucri subhemisphærici circa 4-serialis phyllis ovato-oblongis obtusissimis interioribus lamina sordide alba parum radiante onustis intimis quam reliqua angustioribus, receptaculi paleis numerosis lineari-lanceolatis acutis achænia longe superantibus deciduis, flosculis inclusis 4–5 exterioribus femineis reliquis hermaphroditis, antherarum caudis microscopicis elongatis ramulosis, achæniis cylindrico-turbinatis glabris, pappi setis inter se liberis scabridis albis.

Hab. Mohely (Mohilla) Island; *Boivin*, sine no.

Folia juniora nondum passa 2.5–3.0 $\times$ 0.3–0.4 cm., excepta costa centrali fac. inf. parum eminente enervosa, seniora deinde supra fere glabra subtus araneosa, folia summa in bracteas trans-euntes. Cymæ 2.0–3.0 cm. long. et diam. Pedunculi proprii ut pedunculus tomentosi, quam involucra sæpissime breviores. Capitula 0.3 cm. long., vix totidem lat. Involucri phylla extima 0.2 cm., interiora 0.25 cm. long. Receptaculi paleæ 0.1 cm. long. vel paullulum ultra, 1-nervosæ, leviter carinatae. Utriusque sexus flosculi 0.15 cm. long. Achænia 0.05 cm., pappus 0.2 cm. long.

This belongs to *Rhynea* and not to *Cassinia* proper, the heads being heterogamous and the anthers provided with long tails, to see which, however, the compound microscope is absolutely necessary.

The occurrence of a Mascarene *Cassinia* is a matter of much interest, the species hitherto known being natives of Australia or New Zealand or South Africa.

Sphacophyllum pusillum, sp. nov. Herba parvula puberula caule perbrevis ramulos gracillimos curvato-ascendentes ex collo gignante, foliis parvis pinnatifidis rhachi necnon lobis sæpius bijugis linearibus vel integris et tunc linearibus raro lineari-lanceolatis omnibus sessilibus summa imminutis, pedunculis folia longe excedentibus ramulos singillatim terminantibus monocephalis gracilibus, capitulis minimis 24-flosculosis, involucri hemisphærici phyllis biseriatis lineari-lanceolatis sursum parum sphacelatis apice acuminatis extus puberulis, receptaculi paleis involucri phyllis similibus nisi angustioribus, ligulis 4 brevibus obovatis bidentatis, flosculis hermaphroditis breviter exsertis, achæniis cylindricis glabris, pappo brevissimo.

Hab. Ankaiana and Bara, Madagascar; *Deans Cowan*.

Tota planta circa 6.0–8.0 cm. supra solum attingens. Radix elongata, raro fibrillosa. Caulis modo 1.0 cm. long. et 0.2–0.25 cm. diam. Ramuli (pedunculo 0.3–0.35 cm. long. incluso) 0.5–0.7 cm. long. Folia $\pm$ 0.6 cm. long.; rhachis necnon lobi circa 0.1 cm. lat.; raro folia 0.2 cm. lat. quando integra vel subintegra. Capitula 0.4 $\times$ 0.35 cm. Involucri phylla inter se æqualia, 0.3 cm. long., aliquanto cymbiformia. Ligulæ 0.25 $\times$ 0.18 cm., luteæ. Disci corollæ 0.15 cm. long.; tubus basi papillosus. Achænia 0.08 cm. long.

A very distinct species, easily recognized by its lowly habit and small flowering-heads.

Senecio foliatis, sp. nov. Caule sat robusto erecto dense folioso pluristriato brunneo-pubescente dein puberulo, foliis lanceolato-oblongis obtusis basi subrotundatis obtusisve margine crebro serrato-crenatis supra glabrescentibus subtus brunneo-pubescentibus coriaceo-membranaceis petiolis brevibus pubescentibus basi auriculis rotundatis onustis suffultis, capitulis parvis heterogamis radiatis circa 20-flosculosis in cymis terminalibus subcongestis multicephalis dispositis, pedunculis propriis bracteis parvis crebro instructis involucria sæpius æquantibus vel leviter excedentibus, involucri anguste campanulati phyllis 8 lineari-oblongis obtusis vel acutis juxta apicem paullo angustatis margine membranaceis dorso striatis fere omnino glabris firmis in sicco læte brunneis calyculi phyllis paucis lanceolatis abbreviatis, flosculis luteis breviter exsertis paucis extimis femineis horum corollis in ligulam perbreve obovatam sæpissime 4-lobam mutatis, styli ramis truncatis penicillatis, achæniis exterioribus compressiusculis interioribus anguste cylindricis omnibus pluristriatis glabris, pappi setis scabriusculis albis.

Hab. Comoro Islands; *Humblot*, 256.

Folia (petiolo 0.5–1.0 cm. long. incluso) 4.0–8.0 cm. long., 1.3–2.0 cm. lat., fac. sup. in sicco fusca vix nitidula; costæ costulæque supra impressæ subtus prominulæ. Cyma 6.0–7.0 $\times$ 4.0–5.0 cm.; ejus rami brunneo-pubescentes. Capitula 0.6 $\times$ 0.4 cm.

Calyculi phylla circa 0.15 cm., involucri 0.5 cm. long. Ligulæ modo 0.2 cm. long. Disci corollæ sursum paullo ampliatae, 0.4 cm. long. Styli rami 0.1 cm., achænia 0.2 cm., pappus 0.55 cm. long.

Nearest *S. Ambavilla* Pers., which has different leaves, smaller fewer-flosculed heads with longer ligules, &c.

Cloiselia, *Mutisiacearum* genus novum. (Plate 478A.)

Capitula homogama, pauciflosculosa, flosculis omnibus hermaphroditis. Involucrum parvum, turbinatum, phyllis pluriseriatis interioribus gradatim longioribus coriaceis obtusis vel acutiusculis nequaquam spiniferis. Receptaculum planum, sparsim fimbrilliferum. Corollæ longe exsertæ, tubo elongato anguste oblongo, limbo bilabiato labii anterioris lobis altius connatis. Antheræ basi in caudas elongatas piloso-barbellatos inter se per paria connatos desinentes. Styli rami breves, erecti, oblongi, obtusissimi. Achænia turbinata, late 10-sulcata, inferne dense villosa. Pappi setæ subpaleaceæ, inter se inæquilongæ, rigidæ, biseriatæ, scabridæ, ex involucrio longe eminentes.—Arbor elata. Folia parva, alterna, coriacea. Capitula submediocria, ad apicem ramulorum ultimorum solitaria, subsessilia.

Cloiselia carbonaria, sp. unica. Ramulis rigidis cito glabris cortice griseo lenticellifero obductis ultimis angulatis fuscis cinereo-puberulis, foliis anguste oblanceolato-spathulatis obtusissimis sæpe mucronulatis basi in petiolum gracilem longe attenuatis integris supra glabris subtus minute argyraceo-pubescentibus, pedunculo quam involucrum multo brevior argyraceo-pubescente, capitulis 4-flosculosis, involucri circa 6-serialis argyraceo-pubescentis phyllis parvis ovatis obtusis extimis imminutis intimis sursum attenuatis apiceque acutiusculis, corollæ tubo quam limbus 5-plo longiore paullo supra basin subito coartato inde leviter amplificato limbi lobis lineari-lanceolatis obtusiusculis erectis vel paullulum recurvis, antheris paullo exsertis harum caudis quam se ipsas parum brevioribus, stylo exserto glabro, achæniis aliquantulum compressis sursum glabris necnon fuscis et politis, pappi setis patulis purpureis vel purpureo-brunneis achænia longe excedentibus.

Hab. Port Dauphin; *Cloisel*, No. 35.

Foliorum limbus $\pm$ 3.0 cm. long., 0.7–1.0 (raro 1.3) cm. lat., fac. sup. vix nitidus utrinque perspicue aperte reticulato-nervosus; petioli 0.5–1.0 cm. long., puberuli. Pedunculi circa 0.3 cm. long. Involucrum fere 1.0 cm. long.; phylla extima 0.2 cm., intermedia 0.45 cm., intima 0.6 cm. long. Receptaculi paleæ perpaucae, lineares, minutæ. Corolla humectata in toto 2.4 cm. long.; tubus 2.0 cm. long., paullulum supra basin 0.25 cm., juxta medium fere 0.5 cm., superne vix 0.4 cm. diam.; limbi lobi postici 0.4 cm., antici 0.1 cm. long. Antherarum loculi apicem versus attenuati vix 1.0 cm. long.; horum caudæ 0.7 cm. Stylus crassiusculus, vix 3.0 cm. long.; hujus rami 0.13 cm. long. Achænia 0.45 $\times$ 0.4 cm.; pappi setæ 0.7–1.8 cm. long.

A remarkable plant, the single small specimen as it lies on the sheet having much the appearance of a *Metrosideros*. It shows some

affinity with *Dicoma*, especially in the achene and pappus, but differs from that genus in the small involucre of leathery leaves not spinous at the tip, in the presence of paleæ on the receptacle few and small though these are, in the few-flowered heads and the bilabiate corollas. From this latter character one is inclined to search for a nearer relationship in the subtribe *Gerbereæ*, and the suggestion is accordingly offered that its true position is in that subtribe next to *Oldenburgia*.

The native name is "Hazobé," and the collector's note further tells us that the wood is burnt for charcoal. The flowers are said to be red; but this statement refers most probably to the conspicuous red setæ of the pappus, as the corollas would appear to have been white, although certainty on the point is of course impossible.

A word of warning is necessary regarding fig. *b*, depicting the corolla. While this drawing is believed to be correct, a better specimen may show some slight difference in the length of the lobes, especially the anticus ones. With a view of confirming my impression on this point, I applied to M. Jules Poisson, of the Paris Museum, in hopes that perfect corollas might be in that institution. But M. Poisson, whose kind offices are hereby gratefully acknowledged, writes that the Paris specimens have only achenes, and so the matter in question must at present remain somewhat doubtful.

Dicoma (§ BRACHYACHÆNIUM) **Cowani**, sp. nov. Verisimiliter fruticosa ramulis rigidis crebro foliosis araneoso-pubescentibus cito glabris, foliis oblongis vel oblongo-linearibus apice subito acuminato-apiculatis basin versus in petiolum brevissimum attenuatis integris vel minute calloso-crenulatis coriaceis uninervibus fac. sup. diuscule araneoso-pubescentibus deinde glabris fac. inf. cinereo-tomentosis, capitulis pro rata parvis homogamis circa 14-flosculos ramulos laterales perbreves pusillifolios solitatem terminantibus, involucri subhemisphærici circa 6-serialis phyllis anguste ovato-lanceolatis apice breviter spinuloso-acuminatis interioribus gradatim longioribus necnon comparate angustioribus intimis lineari-lanceolatis acuminatis omnibus margine anguste membranaceis et lacerato-ciliolatis, receptaculo foveolato, flosculis subexsertis, corollæ lobis patentibus, antherarum caudis piloso-barbellatis, achæniis obscure 10-costatis villosis superne glabris quam pappi pluriseriati saturate straminei setæ scabridæ inter se valde inæquilongæ multo brevioribus.

Hab. Madagascar, Ankafana; *Deans Cowan*.

Folia 3.0-6.0 cm. long., 0.5-0.8 cm. lat., raro 1.0 cm., supra in sicco brunnea vel olivaceo-grisea, costa necnon costulæ supra impressæ subtus eminentes; petiolus 0.2-0.3 cm. long. Ramuli cephalophori modice 0.5-1.0 cm. long.; horum folia $\pm$ 0.5 cm. long., quorum summa capitulum involucrent. Capitula pauciflora 1.5 $\times$ 2.0 cm. Involucri phylla extima 0.2-0.3 cm., intermedia 0.4-0.7 cm., intima 1.1 cm. long.; phylla omnia rigida, brunnea, margine straminea. Corollæ in toto 1.3 cm. long.; tubus 0.5 cm. long., 0.075 cm. diam., ipsis sub faucibus adusque 0.175 cm. subito dilatatus; lobi anguste lineares, obtusiusculi, 0.8 cm. long., 0.06 cm.

lat. Antherarum loculi 0·6 cm. long., exemptis caudis 0·2 cm. Achænia fere 0·3 × 0·2 cm.; pappi setæ 0·3–1·0 cm. long.

Can be told at once from *D. incana* O. Hoffm. by the size, shape, and clothing of the leaves, and the smaller heads with smaller involucreal leaves in more rows.

ACANTHACEÆ.

Afromendonia madagascariensis, sp. nov. Ramis brunneo-pubescentibus deinde glabris, foliis brevipetiolatis oblongo-ovatis acutis obtusisve nonnunquam obtusissimis basi rotundatis vel brevissime cordatis coriaceis costis pubescentibus exemptis fere glabris fac. sup. leviter nitescentibus costis costulisque eleganter reticulatis fac. inf. maxime aspectabilibus, floribus in axillis 1–3, pedicellis bracteolas excedentibus gracilibus fulvo-hirtulis, bracteolis inter se fere omnino liberis ovatis apice subito acutatis extus fulvo-hirtulis, calycis dense pubescentis lobis parvis triangularibus, corollæ tubo bracteolas bene excedente sursum leviter amplificato glabro, ovario dense hirsuto ab initio 1-loculari, ovulis binis, drupa anguste obovoidea, pubescente, monosperma.

Hab. Central Madagascar; *Baron*, 1448 (fruit), and 3810 (flower and fruit).

Folia 5·0–7·0 cm. long., 3·0–3·8 cm. lat.; costæ secundariæ utrinque 5–7, suboppositæ distantesve, angulis variis insertæ, marginem versus valde arcuatæ; petioli 0·5–0·8 cm. long., brunneo-pubescentes. Pedicelli 2·5–3·0 cm. long., sub flore incrassati necnon hicce dense pubescentes. Bracteolæ circa 2·0 × 1·0 cm. Calyx totus 0·2 cm. long.; lobi 0·1 cm. Corollæ tubus 2·8 cm. long., basin versus 0·4 cm., juxta medium 0·22 cm., faucibus 0·6 cm. diam.; lobi oblongo-obovati, obtusissimi, 0·7 × 0·6 cm. Antherarum loculi inter se parum inæquales, basi barbati, 0·4–0·6 cm. long. Discus valde prominens, carnosus, 0·2 cm. alt. Ovarium subsphæroideum, 0·2 cm. long. et diam. Stylus glaber, sursum plane complanatus, 1·6 cm. long. Stigma infundibuliformi-subbilabiatum. Drupa 1·5 × 0·8 cm., pubescens.

Afromendonia Cowani, sp. nov. Ramis brunneo-hirtulis, foliis brevipetiolatis ovatis breviter cuspidatis apice obtusis basi rotundatis coriaceis fac. sup. fere glabris scabriusculis leviter nitidis costis maxime impressis percursis fac. inf. præter costas valde eminentes hirsutas et pilorum pulvillas axillares fere glabris, floribus in axillis solitariis vel binis, pedicellis bracteolas paullo excedentibus gracilibus nutantibus piloso-hirtulis, bracteolis ultra medium connatis ovatis obtusis extus appresse fulvo-hirtulis, calyce minimo undulato-lobulato glabro, corollæ tubo bracteolas superante superne gradatim amplificato glabro, ovario ovoideo dense hirsuto ab initio 1-loculari 2-ovulato, drupa —.

Hab. Tanala, Madagascar; *Deans Cowan*. [Also in herb. Kew. Central Madagascar; *Baron*, 289.]

Folia modice 6·0–7·0 cm. long., 3·0–3·5 cm. lat.; costæ secundariæ ut eæ præcedentis; petioli 0·7–1·0 cm. long. Pedicelli fere 3·0 cm. long., sub flore incrassati. Bracteolæ 2·0 × 1·0 cm. Calyx 0·15 cm. long. Corollæ tubus 3·0 cm. long., inferne 0·25–0·3 cm.,

superne 0.5–0.7 cm. diam.; lobi obovati, 0.7 cm. long. Antherarum loculi inter se inæquales, 0.75–0.9 cm. long., basi barbati. Discus præcedentis.

The genus *Afromendonia* is new to Madagascar. The two plants above described, though quite unlike their African congeners, bear a treacherous resemblance to each other, being as regards foliage virtually indistinguishable. The two chief points of difference reside in the bracts, almost free in the one case and connate a long way up in the other, and the calyx, which is larger in *A. madagascariensis*, densely hairy and has distinct lobes.

A plant distributed from Kew under the name of "*Pyrenacantha* sp." (*Baron*, 4196) would seem to be a third species of this genus. In habit, drupe, and seed it is a typical *Afromendonia*; but flowers are unfortunately absent, and in these circumstances the matter must remain doubtful.

Hygrophila (§ NOMAPHILA) **Baroni**, sp. nov. Caule basi repente sursum ascendente et crebro ramoso, ramulis bene foliosis gracillimis microscopice puberulis dein glabris, foliis parvulis ovatis obtusis basi aliquanto cordatis vel rotundatis superioribus ovato-lanceolatis in bracteas transeuntibus omnibus subsessilibus vel brevipetiolatis minute pubescentibus puberulisve additis paucis vetustioribus majoribus oblongo-lanceolatis necnon longiuspetiolatis, bracteis lanceolatis acuminatis quam pedicelli longioribus brevioribusve, bracteolis lineari-subulatis calyce brevioribus, floribus pedicellatis vel subsessilibus in panicula ramosa laxa multiflora digestis, calycis lobis paullo supra basin liberis lineari-setaceis puberulis lobo postico plane longiore, corollæ extus puberulæ tubo calycem excedente sursum sensim ampliato labiis tubum subæquantibus labio antico longitrorsum 2-plicato, ovario oblongo glabro apice ut stylus piloso-puberulo, ovulis quove in loculo 8.

Hab. North Madagascar; *Baron*, 6269.

Folia vetustiora 1.5–2.0 × 0.8 cm. (horum petioli circa 0.5 cm.) long.; folia modice 0.7–1.5 × 0.4–0.7 cm., horum petioli summum 0.2 cm. long. Bracteæ ± 0.5 × 0.3 cm. Bracteolæ 0.2 cm. long. vel magis. Pedicelli adusque 0.5 cm. vel etiam longiores. Calycis tubus 0.1–0.2 cm., lobi 0.4 cm. long., posticus 0.65 cm. Corolla in toto 1.4 cm. long.; tubus 0.9 cm. long., basi 0.2 cm. faucibus 0.35 cm. diam.; labii postici dentes 0.05 cm. long.; antici lobi ovato-oblongi, obtusissimi, 0.3 cm. long. Antheræ 0.13 cm. long. Ovarium 0.25 cm., stylus 1.0 cm. long. Capsula 1.0 cm. long., semina 0.08 cm.

A very distinct species, apparently nearest *H. gracillima* Burkill, but at once distinguished from it by the ovate leaves and much laxer inflorescence.

STENANDRIUM BOIVINI Baill. in *Hist. des Plantes*, x. 461 (*nomen tantum*). Through the kindness of M. Jules Poisson, I have been enabled to examine a specimen of this plant. The genus is American; the alleged occurrence of a species in Madagascar consequently invites challenge, although this extension of range rests on the authority of so capable a botanist as Baillon. The result of

a careful examination convinces me that the plant is really a *Crossandra*, for it is a small undershrub with the characteristic inflorescence of *Crossandra*, and the hinder segment of its calyx markedly larger than the rest, although indeed the peculiar double nervation of this organ is absent. As the species is believed to be undescribed, the following short diagnosis is here appended:—

CROSSANDRA BOIVINI S. Moore. Suffrutex parvus, ramis cortice papyraceo albido obductis, foliis parvis longipetiolatis oblongis vel oblongo-ovatis obtusis tenuiter membranaceis leviter puberulis, spicis abbreviatis subsessilibus paucifloris, bracteis triangulari-obovatis sursum horizontalibus apice breviter spinuloso-acuminatis integris eleganter reticulatis membranaceis pubescentibus, bracteolis lineari-lanceolatis longe acuminatis calycem paullo excedentibus piloso-pubescentibus, calycis lobis lineari-lanceolatis (lobo postico lanceolato) longe acuminatis superne piloso-pubescentibus, corollæ tubo bracteas bene excedente extus piloso-pubescente.

Hab. Madagascar, Port Lewen; *Boivin*.

Foliorum limbus 3.5–4.0 cm. long., 1.2–2.0 cm. lat.; petioli modice circa 1.5 cm. long. Spica 1.3 cm. long., cylindrica. Bracteæ fere 1.0 cm., bracteolæ 0.8 cm., calyx 0.7 cm. long. Corollæ tubus 1.5 cm. long., ima basi 0.12 cm., juxta medium 0.05 cm., faucibus 0.12 cm. diam.; limbus circa 0.6 cm. diam. Pollinis grana normalia. Capsulam non vidi.

Crossandra Cloiselii, sp. nov. Suffrutex caule erecto simplici vel sursum pauciramoso puberulo mox glabrescente, foliis obovato-ob lanceolatis vel anguste ellipticis apice nunc obtusis nunc obtusissimis vel etiam paullo retusis basin versus in petiolum distinctum sensim angustatis utrinque microscopice puberulis tenuiter coriaceis, pedunculis quam folia brevioribus pubescentibus, spicis cylindricis foliis brevioribus subæqualibusve, bracteis amplis oblongo-ovatis apicem versus gradatim coartatis apice ipso mucronatis margine integris vel rarissime brevissime spinuloso-dentatis membranaceis microscopice puberulis reticulato-nervosis, bracteolis anguste lanceolatis acuminatis calycem paullulum excedentibus, calycis lobis anticis oblongo-lanceolatis quam laterales conformes plane longioribus lobo postico antico æquilongo ovato longitrorsum 3-nervi apice breviter bifido, corollæ tubo e bracteis eminente extus fulvo-pubescente, ovario oblongo glabro, stylo piloso, capsula —.

Hab. Fort Dauphin; *Cloisel*, 74 and 86.

Planta spithamea vel ultra. Foliorum limbus modice 7.0–12.0 × 2.5–4.0 cm.; costa media incrassata; costæ secundariæ utrinque 8–10, delicatulæ, latissime fornicatæ, prope marginem dichotomæ; petiolus ± 1.0 cm. long., puberulus. Pedunculus adusque 3.0 cm. long., sæpe vero brevior. Spica 5.0–6.5 cm. long., 1.5–2.0 cm. diam. Bracteæ circa 2.3 × 0.8 cm. Bracteolæ 1.0 cm. vel paullo ultra. Calycis lobi antichi 0.9–1.0 cm., laterales 0.65–0.7 cm. long. Corollæ flavæ tubus 3.0–3.5 cm. long., 0.15 cm. diam., sub faucibus 0.225 cm.; limbus circa 2.5 cm. diam. Antheræ 0.2 cm. long. Discus inconspicuus. Ovarium 0.25 cm., stylus circa 2.5 cm. long.

Near *C. pungens* Lindau, but quite different in leaves, bracts, &c.

The plant numbered 74 is noted upon the label as a “grand

arbre," evidently by mistake, unless there has been some transference of labels.

Crossandra longipes, sp. nov. Verisimiliter fruticosa ramulis sat validis pluristriatis griseo-pubescentibus, foliis anguste oblongo-lanceolatis obtusis inferne in petiolum brevem sensim attenuatis tenuiter coriaceis supra puberulis subtus griseo-pubescentibus, pedunculis folia bene excedentibus minute griseo-pubescentibus, spicis cylindricis quam pedunculus multo brevioribus, bracteis amplis ovatis apice rotundatis apice ipso sæpe breviter mucronulatis integris margine barbato-ciliatis infimis dorso griseo-pubescentibus ceteris microscopice puberulis longitrorsum pluristriatis vix nervosis chartaceis, bracteolis parvis ovato-lanceolatis calyci subæquilongis, calycis lobis anticis ovato-lanceolatis obtusis quam laterales oblongo-ovati longioribus lobo postico ovato apice integro obtusissimo omnibus obscure nervosis, corollæ tubo bracteas excedente extus dense griseo-pubescente, antheris barbato-ciliatis, ovario oblongo obscure puberulo, stylo pilosiusculo, capsula —.

Hab. Fort Dauphin; *Cloisel*, without number.

Folia 4.5–8.0 cm. long., 0.8–2.0 cm. lat.; costa media valde perspicua; costæ secundariæ utrinque circa 10, parum arcuatæ, delicatissimæ; petioli 0.5–1.0 cm. long., griseo-pubescentes. Pedunculus 9.0 cm. long. Spica 3.5 cm. long., 1.5 cm. diam. Bracteæ circa 1.3 × 0.8 cm. Bracteolæ 0.7 cm. long. Calycis lobi antici 0.65 cm., laterales 0.4 cm., anticus 0.7 cm. long. Corollæ verisimiliter flavæ tubus circa 2.3 cm. long., deorsum 0.25 cm., sursum 0.1 cm. diam. vel paullo ultra; limbus fere 2.5 cm. diam. Antheræ 0.18 cm. long. Ovarium 0.3 cm., stylus 1.3 cm. long.

The habit is that of *C. nilotica* Oliv. and *C. subacaulis* C. B. Clarke, but the plant differs from both, *inter alia*, in the chartaceous striate bracts, in which respect the resemblance is with *C. guineensis* Nees, though as regards many other characters, *e. g.*, form of the spike, size and shape of the bracts, &c., the two are abundantly distinct.

As Mr. Clarke, who kindly examined the specimen, pointed out to me, the posticous calyx-lobe is peculiar, inasmuch as it is entire at the tip, and the nerves, usually so pronounced in this organ, are very obscurely indicated. The pollen is, however, quite normal.

Stenandriopsis, *Justiciearum* genus novum. (Plate 478 B.)

Calyx adusque basin 5-partitus, lobis subscariosis comparate latis lobo postico reliquis majore. Corollæ parvæ hypocraterimorphæ tubus attenuatus, sursum dilatatus incurvusque; limbus 5-lobus, inter se æquales vel anticus minor. Stamina 4, didynama, infra fauces affixa, inclusa; filamenta brevia; antheræ inter se cohærentes, 1-loculares loculo angusto mutico. Pollinis grana subsphæroidea, leviter complanata ambitu subrotunda, lævia, rima unica instructa (Spaltenpollen). Stylus inclusus, ramis 2 brevibus subrhombicis. Ovula quoque in loculo 2. Capsula crassa, oblonga, obtusa, fere a basi 4-sperma. Semina ovali-oblonga, lævia vel summum leviter rugulata, retinaculis validis compressiusculis fulta. — Verisimiliter

frutex aspectu *Thomandersiæ*, foliis integerrimis. Flores parvi, sparsi, sessiles, in spica terminali 2-fariatim dispositi. Bractea bracteolæque parvi, hæc illis subæquales.

Stenandriopsis Thompsoni, sp. nov. Ramis foliosis ad nodos tumidis cito glabrescentibus, foliis anguste ellipticis sursum cuspidato-attenuatis apice obtusis basin versus in petiolum brevem gradatim attenuatis raro basi subrotundatis glabris vel summum pag. inf. appresse puberulis, spicis quam folia brevioribus obscure puberulis, bractea bracteolisque ovato-oblongis obtusis margine ciliolatis ut calycis lobi pluristriatis, calycis lobis oblongo-lanceolatis (postico ovato-lanceolato) obtusis bracteolas 2-plo superantibus ciliolatis, corollæ tubo calycem $2\frac{1}{2}$ -plo superante extus minutissime pubescente limbi lobis ovato-oblongis obtusissimis, ovario obovoideo-oblongo obtusissimo, stylo glabro, capsula calycem 3-plo excedente fusco-brunnea subnitida.

Hab. Madagascar; *Vaughan Thompson*; *Baron*, 6708.

Folia modice 10.0–14.0 $\times$ 3.0–4.5 cm., adest vero specimen cujus folia 2.5–4.0 $\times$ 1.0–2.0 cm. metiuntur; costæ secundariæ utrinque 8–12, latissime fornicatæ; petioli solemniter 1.0–2.0 cm. long. Spicæ 5.0–10.0 cm. long. Bracteæ bracteolæque 0.3–0.35 cm., calycis lobi 0.4–0.5 cm. long. Corollæ tubus 1.0 cm. long., inferne 0.1 cm. superne 0.15 cm. diam.; limbus 0.8 cm. diam.; lobi 0.5 $\times$ 0.25 cm., lobus anticus 0.35 $\times$ 0.2 cm. Ovarium 0.2 cm. long., 0.15 cm. lat.; stylus vix 0.7 cm. long. Capsula 1.2 cm. long. Semina 0.35 $\times$ 0.2 cm., brunnea.

The genus here proposed differs from *Crossandra* in the flowers arranged in two rows, in the small bracts, the relatively large bracteoles, the entire posticous calyx-lobe, the front lobe of corolla, the biscuit-shaped pollen, and the smooth seeds. From *Stenandrium*, which it much resembles in inflorescence, it is distinguished by habit, the pollen, and the seeds.

One of *Vaughan Thompson*'s two specimens has much smaller leaves than *Baron*'s here depicted; the other is a fruiting one with large leaves.

(To be continued.)

PLANTS OBSERVED NEAR TOMINTOUL, N.B., JULY, 1905.

By REV. E. S. MARSHALL, F.L.S., & W. A. SHOOLBRED, F.L.S.

WE spent rather more than a fortnight in this village, which is reputed to be the highest in Scotland (1150 ft.). The flora of the surrounding district, which does not appear to have been systematically explored, is fairly interesting, owing to the occurrence of limestone at intervals, ranging in elevation from 800 up to about 2000 ft. Owing to the long distance, we were unable to work the richest parts of the Ben Avon range thoroughly; their alpine vegetation is not so rich as we had expected, and the dry summer was unfavourable. Several interesting species were noted near Cock

Bridge, v.-c. 92, S. Aberdeen, and Bridge of Brown, v.-c. 96, E. Inverness; but the bulk of our work was done in v.-c. 94, Banff. Apparently new vice-comital records are starred.

We are indebted for valuable help in identification to Mr. Arthur Bennett, Revs. A. Ley, E. F. and W. R. Linton, and Dr. Karl Domin.

Ranunculus scoticus E. S. Marshall. *94. Shores of Loch Builg (1585 ft.).

Caltha radicans Forster. 92. Cock Bridge; some specimens closely approach the original plant, but on the same individual there is a considerable range of variation in the shape and cutting of the foliage. *94. Frequent in the valleys of the Avon and Conglass Water.

Arabis petræa Lam. var. *hispida* DC. *94. Abundant on river-shingles; scarce on Ben Avon, at 3000 ft. The smooth-leaved form was not seen.

Cardamine pratensis L. var. *dentata* Hayne & Welw. *94. Gravelly shore of the Conglass Water. "These agree fairly well with G. Nicholson's specimens that were issued as authentic some years ago, and gathered near Kew." *Ar. Bennett in litt.*, see Journ. Bot. 1880, 202. — *C. flexuosa* With. 94. A luxuriant plant, growing in fair quantity by a rocky, shaded stream called Feith-an-Laoigh, near Loch Builg, at 1500 ft., seems to Mr. Bennett to be near, if not identical with, *C. sylvatica* Link β . *latifolia* Van den Bosch, Prodr. Fl. Batav. p. 20 (1850). Major Wolley-Dod sends to the Bot. Exch. Club a similar, though scarcely so extreme form from Horsham, W. Sussex, as *C. flexuosa* var. *umbrosa* Gren. & Godr.

Draba incana R. Br. Sparingly, ravine of the Water of Ailnack, and on rocks near the Avon, as well as on Ben Avon.

Cochlearia alpina H. C. Wats. 94. Ben Avon (3000 ft.); by the river, a little above Bridge of Avon.

Sisymbrium Thalianum J. Gay. 94. Thatched roof in Tomintoul village.

Heilanthemum Chamæcistus Miller. 94. Frequent on limestone, below Tomintoul.

Viola ericetorum Schrad. 94. River-shingles, Glen Avon. — *V. arvensis* Murr. 94. A small form, with the upper petals mostly blue, grew in an oat-field above Inchrory; we met with the same plant abundantly among corn on Mainland, Orkney, in 1900. — *V. lutea* Huds. var. *amæna* (Symons). 94. Fairly frequent, though local; the type was only noticed about Inchrory.

Polygala vulgaris L. 94. Limestone rocks near Bridge of Avon. — *P. oxyptera* Reichb. grew sparingly on a neighbouring hill at 1200 ft. — *P. serpyllacea* Weihe is frequent on moors, avoiding the limestone.

Silene dichotoma Ehrh. 94. Rather common in clover-fields near the village; of course, introduced.

Cerastium alpinum L. var. **pubescens* Syme and *C. trigynum* Vill. 94. Great corrie of Ben Avon, at 3000 ft.

Arenaria leptoclados Guss. 94. Shingles of the Avon; limestone cliffs above the Builg Burn, at fully 1400 ft.

Sagina Linnæi Presl. 94. Scarce on Ben Avon.—*S. subulata* Fenzl. 94, 96. Among stones by the Burn of Brown, which here forms the county boundary.

Hypericum hirsutum L. 94. Wooded limestone, near Bridge of Avon.

Geranium pratense L. 94. Very scarce and dwarf, just above Bridge of Avon; perhaps escaped, but we did not see it in cultivation.—*G. lucidum* L. *94. Limestone rocks (about 1300 ft.) above Inchrory; rare.—*G. Robertianum* L. var. *modestum* (Jord.). *94. Water of Ailnack; Conglass Water; very local.

Genista anglica L. 94. Here and there on the hills, ascending to 2000 ft.

Trifolium medium L. 94. Common on limestone up to 1100 ft.; flowers often remarkably large and deep-coloured.

Anthyllis Vulneraria L. is not unfrequent.

Vicia sylvatica L. 94. A form with pure white flowers grows with the type near Bridge of Avon and in the Conglass Valley.

Alchemilla vulgaris L. 94. Vars. *alpestris* (Schmidt) and *fili-caulis* (Buser) are both frequent; we did not observe *pratensis* (Schmidt).

Rosa mollis × *pimpinellifolia*. *94. Limestone cliffs (1400 ft.) above the Builg Burn; the only station seen for *R. pimpinellifolia*.—*R. mollis* abounds; *R. tomentosa* being apparently quite scarce, and hardly reaching 1000 ft.—*R. glauca* Vill. var. *subcristata* Baker. 94. One bush, near Bridge of Avon; the only example of this group that was met with, though ordinary lowlands. *R. canina* is plentiful. This is strange, taking into account the generally sub-alpine character of the flora. No fruticose *Rubi* were seen, as was to be expected.

Pyrus Aria Ehrh. var. *rupicola* Syme. *94. One fine tree, on the limestone cliffs (1400 ft.) above the Builg Burn, clearly native; no doubt others occur on much more thickly wooded limestone rocks south of the Avon, opposite Inchrory, which we had not time to explore. This discovery proves that *P. Aria*, in one of its forms, is truly wild in Scotland, even if not so near Braemar.

Sedum Telephium L. var. *Fabaria* H. C. Wats. 94. Naturalised by the Conglass Water in one spot.—*S. villosum* L. 94. Conglass Valley. 94, 96. Glen Brown.

Myriophyllum alterniflorum D.C. 94. Loch Builg.

Epilobium angustifolium L. 94, 96. A subalpine form with narrower leaves than usual, found on rocks by the Builg Burn and near Bridge of Brown, is probably what was mistaken for *E. Dodonæi* Vill. (*rosmarinifolium* Haenke) in Glen Tilt, E. Perth.—*E. obscurum* × *palustre*. *94. Conglass Valley.—*E. alsinefolium* Vill. 92, 94. Unusually fine and abundant by the Don, Cock Bridge, and along the Conglass Water.—*E. alsinefolium* × *montanum*. *94. Conglass Water; one strong plant.—*E. alsinefolium* × *obscurum*. *94. Conglass Water; several plants.—*E. alsinefolium* × *palustre*. *94. A single specimen in a swamp, Conglass Valley, associated with plenty of the parents.—*E. anagallidifolium* × *obscurum*. *94. Conglass Water; scarce.

Meum Athamanticum Jacq. *94. Grassy bank near the Conglass Water, below a farm called Glenmullie.

[*Leristicum officinale* Koch. One large plant, in good flower and fruit, was found by the river, a short mile below Bridge of Avon; we noticed another outside a ruined cottage at Tomintoul, showing how it originated.]

Galium sylvestre Poll. 94. Shingles of the Avon and limestone rocks, frequent; sometimes closely approaching var. *nitidulum*, but more often intermediate between that and the type.—*G. uliginosum* L. 94. Only seen sparingly in one swamp, Conglass Valley.

Asperula odorata L. 94. Water of Ailnack and Avon Valley; uncommon.

Erigeron acre L. *94. In crevices of limestone cliffs above the Builg Burn, at about 1400 ft., in small quantity; subperennial, with paler flowers and a more virgate inflorescence than the usual plant of southern England. The special interest of this occurrence consists partly in its great rarity as a Scottish species (the only known native station being Sands of Barry, Forfarshire), and partly in its subalpine situation; for, although Hooker, Fl. Scot. 242, gives "mountain pastures," and Lightfoot, Fl. Scot. (1777), says, "Frequent in dry mountainous pastures," no confirmation of these statements appears to exist. In Yorkshire it grows up to 300 ft.; and Mr. Bennett believes that he has seen it at a somewhat greater elevation in Surrey. It ascends to 650 ft. in Norway, reaching 70° 2' in Finmark, and being pretty freely distributed through Scandinavia. Dr. Karl Domin writes of our plant as follows:—"I find no difference at all from the *Erigeron acre* of Central Europe, except that the leaves are a little broader and the plant handsomer. *E. acre* is always biennial or perennial [Hooker, Stud. Fl., says, "annual or biennial"; Bab. Man., "biennial"] . . . Many forms and varieties of *E. acre* have been described; e.g., that which is known as *E. droebachensis* O. F. Muller, an almost glabrous variety of our species, to which the totally glabrous *E. glaberrimus* Scheele belongs as a mere form. *E. elongatus* Ledeb., *E. acre* β . *glabratum* Neilr., and var. *glabrior* Borb. also belong to the var. *droebachensis*. . ." Our largest specimen measured about 20 in. in height; plants still taller and more robust have been found near Godalming, Surrey, in a rough copse that had been recently cut. The latest arrangement of this species (i.e., the French forms) is that of Rouy, Fl. de France, vol. viii., where the main divisions run:— α . *typicus* Schmidely (= *E. corymbosus* Wallr.). β . *serotinus* Wirtg. γ . *glaber* Corb. Nyman (*Conspectus*, p. 389) retains *E. droebachense* Müll. as a species.

Saussurea alpina DC. *94. Great corrie of Ben Avon; rocks of Big Brae, above Lochan-nan-Gabhar.

Crepis succisifolia Tausch. 94. Shaded ground on limestone, chiefly near Bridge of Avon; rather scarce and local.

Hieracium Pilosella, L. var. *nigrescens* Fr. *94. Avon Valley, below Tomintoul.—Var. *concinnum* F. J. Hanb. *94. Water of Ailnack. *96. Glen Brown, on shingles near the Burn.—*H. petiolatum* Elfstand. 94. Ben Avon; rocks above Lochan-nan-Gabhar. At about 3000 ft. in both stations; the same yellow-styled form

which we collected on Cairngorm in 1898.—*H. holosericeum* Backh. 94. Scarce, with the last-named, above Lochan-nan-Gabhar; *H. eximium* Backh. var. *tenellum* Backh. and *H. lingulatum* Backh., also occurred here.—*H. gracilentum* Backh. 92. Sparingly, near the top of Big Brae, on the south side.—*H. nigrescens* Willd. var. *gracilifolium* F. J. Hanb. *94. Feith-an-Laoigh, near Loch Builg.—*H. chrysanthum* Backh. 92, 94. In several places on the Ben Avon range, but not abundant.—*H. chrysanthum* × *Sommerfeltii*. *94. Two plants gathered at 3000 ft., above Lochan-nan-Gabhar, one monocephalous, the other barren, are evidently this new hybrid. Leaves blotched, intermediate in size and shape; head much as in *chrysanthum*, but smaller and less glandular. Another probable hybrid, *H. chrysanthum* × *Schmidtii*?, was gathered (two specimens) on the limestone above the Builg Burn, and is very fairly intermediate between these species; it grew with *H. Schmidtii*.—*H. anglicum* Fr. 94. Frequent by the Avon, and on limestone rocks; var. **acutifolium* Backh. occurs rarely about Bridge of Avon.—*H. iricum* Fr. *94. Rare; only on limestone near the high-road, between Bridge of Avon and Tomintoul.—*H. Schmidtii* Tausch. *94. By the Avon, two and a half miles above Inchrory shooting-lodge, typical; a variation with stem-leaves two or three (lower large) outer phyllaries floccose-bordered, &c., was collected on limestone about Bridge of Avon.—Var. **crinigerum* Fr. Two small plants, from limestone débris above the Builg Burn, agree in all essential points with W. A. S.'s specimens from coast cliffs near Obe, S. Harris.—*H. pseudonosmoides* Dahlst. 92. Cock Bridge, in small quantity. *94. Avon Valley; fine and abundant at one spot below Tomintoul, and sparingly about three miles lower down.—*H. argenteum* Fr. 92. Cock Bridge. *94. Rocks by the river, just above Bridge of Avon. *96. Luxuriant in a ravine near Bridge of Brown.—*H. Sommerfeltii* Lindeb. 94. Rocks above Lochan-nan-Gabhar, at nearly 3000 ft.; a fair amount of it, but mostly out of reach.—*H. silvaticum* Gouan, var. 94. On limestone, near Bridge of Avon. Rev. W. R. Linton at first thought that it might be *H. pachyphyllum* Purchas, but now considers it to come nearest to var. *prolixum* Dahlst. rather than var. *tricolor* W. R. Linton, to which Rev. A. Ley referred it. Styles yellow; ligules glabrous-tipped.—*H. varicolor* Dahlst. *94. Feith-an-Laoigh.—*H. serratifrons* Almq. var. *Stenstroemii* Dahlst. *94. Feith-an-Laoigh. "Heads more numerous and rather smaller than in the Yorks plant," W. R. L. Gorge of the Water of Ailnack, and among bushes near its confluence with the Avon. "It matches the Upper Wharfedale plant very closely," W. R. L. *H. sagittatum* Lönnr. var. *lanuginosum* Lönnr. *94. One specimen from Feith-an-Laoigh is thus identified by Rev. A. Ley.—*H. sarcophyllum* Stenstr. *94. Feith-an-Laoigh. "The form near *expallidum* and *acrogymnon* [Brit. Hier. p. 55], i. e., closely related to *sarcophyllum*, may be taken as off-type *sarcophyllum*," W. R. L.—*H. euprepes* F. J. Hanb. var. *clivicolum* F. J. Hanb. *94. Plentiful on the wooded banks of the Avon, about two miles below Bridge of Avon. Named by Rev. A. Ley, and assented to by Rev. W. R. Linton (who had at first called it

H. cæsiomurorum), with the remark that "these two run into one another, in their rather numerous forms." The foliage much resembles that of *cæsiomurorum*. *96. By the burn, just above Bridge of Brown; both the above-named plant and characteristic var. *clivicolum*.—*H. pinnatifidum* Lönner. (*H. vulgatum* var. *nemorosum* Lindeberg, Hier. Scand. Exsicc.). *96. Plentiful in shade by the Allt Catanach, close to Bridge of Brown; unfortunately, it was taken at the time to be merely luxuriant *H. vulgatum*, and very few specimens were gathered. In many respects it resembles var. *sejunctum* W. R. Linton, to which name W. R. L. at first assented.—*H. angustatum* Lindeb. var. *elatum* Lindeb. *94. Feith-an-Laoigh.—*H. gothicum* Fr. *96. In good quantity on a bank above the Allt Catanach, near Bridge of Brown. Styles yellow; leaves more plentifully and acutely toothed than usual, sometimes recalling *H. tridentatum* Fr.; heads eglandular. It may deserve a varietal name; we have a plant in cultivation.—*H. sparsifolium* Lindeb. ? *94. One rather starved specimen, with yellow styles, was collected on limestone (1400 ft.) above the Builg Burn. "I should guess this as in *sparsifolium* group, and with the type," W. R. L.—*H. strictum* Fr. var. *reticulatum* (Lindeb.). 96. Burn of Brown.—Var. *angustum* (Lindeb.). 96. Allt Catanach, close to Bridge of Brown.—*H. corymbosum* Fr. *94. By the river, a little below Bridge of Avon. "Near type," W. R. L.—*H. auratum* Fr. *94. Banks of the Avon, rather scarce; a form with smaller heads and narrower leaves than usual was found by the Conglass Water, below Ruthven Bridge.

Lobelia Dortmanna L. 94. Loch Builg (1585 ft.).

Pyrola secunda L. 94. Rocks by the Builg Burn.

Primula veris L. 94. Sparingly on limestone, near Bridge of Avon.

Trientalis europæa L. 94. Frequent in birch-woods,

Myosotis palustris Relh. var. *strigulosa* Mert. & Koch. 94. Glen Avon.—*M. repens* G. Don is common, and *M. versicolor* Reichenb., frequent.

Mimulus Langsdorffii Donn. 94. The form or var. *guttatus* DC. is thoroughly naturalized by the Conglass Water, whence it has spread down the Avon.

Veronica serpyllifolia L. var. *humifusa* (Dickson). 94. Wet rocks of the Ben Avon range; we can also confirm the Ben Avon record for *V. alpina* L.

Euphrasia brevipila Burnat & Gremli. 94. Rather common; as are *E. gracilis* Fr. and (in wet, heathy ground) *E. scotica* Wettst.

Rhinanthus borealis Druce. *94. Great corrie of Ben Avon, at 3000 ft.; scarce.—*R. major* Ehrh. 94. Not uncommon, and occasionally abundant in clover-fields, ascending to 1000 ft. or more.

Melampyrum pratense var. *montanum* Johnst. 94. Frequent on heathery hill-sides.—Var. *hians* Druce. 94. Here and there in the Avon Valley, but local, 96. Bridge of Brown.

Mentha alopecuroides Hull. 94. By a streamlet below Glenmullie Farm, whence it had evidently escaped; *M. hirsuta* Huds. was the only native mint seen.

Origanum vulgare L. and *Calamintha Clinopodium* Spenn. 94. Common on the limestone up to 1000 ft. or more.

Thymus Serpyllum Fr. var. *prostratum* Hornem. 94. Plentiful in Glen Avon, especially on river-shingles.

Galeopsis versicolor Curt. 94. Corn-fields, rather scarce; ascending to over 1300 ft. near Inchrory, with *Lycopsis arvensis* L.—both much dwarfed.

Polygonum Bistorta L. 94. By the river, about a mile below Bridge of Avon; close to a farmhouse, and not flowering.

Rumex domesticus Hartm. 94. Probably the most abundant dock about Tomintoul, ascending to 1200 ft.—*R. domesticus* × *obtusifolius* (*conspersus* Hartm.) was noticed in two places.

Ulmus montana Stokes. 94. Common on limestone rocks and cliffs in Glen Avon.

Salix aurita × *phylicifolia*. *94. Conglass Valley.—*S. aurita* × *repens* (*S. ambigua* Ehrh.). *94. Moorland below Ben Avon.—*S. Caprea* × *phylicifolia*. *94. Shingly island, about a mile below Bridge of Avon.—*S. Caprea* is abundant in the valleys, and grows to a large size; but *S. cinerea* seems to be absent from this neighbourhood.

Juniperus nana L. 94. Not unfrequent on the mountains.

Pinus sylvestris L. 94. Certainly native in the Forest of Glen Avon, but quite scarce; the seedlings seem to be destroyed by deer browsing them.

Epipactis atrorubens Schultz. *94. Limestone rocks below Tomintoul; local.

Orchis latifolia × *maculata*. *94. Boggy slope a little above Ruthven Bridge, with the parents.

Allium oleraceum L. *94. On a low limestone cliff by the Avon; very rare.

Tofieldia palustris Huds. 94. Great corrie of Ben Avon, with *Juncus triglumis* L.

Luzula arcuata Sw. 94. At 3600 ft. on Ben Avon.

Potamogeton alpinus Balb. 94. Small pool in the Conglass Valley.

Scirpus pauciflorus Lightf. *94. Conglass Valley.

Carex pauciflora Lightf. 94. Forest of Glen Avon; confirms the record in Top. Bot.—*C. curta* Good. 94. Conglass Valley; also north-east of Tomintoul.—*C. atrata* L. *94. Great corrie of Ben Avon, above 3000 ft.—*C. aquatilis* L. 92. By the Don at Cock Bridge. In general appearance quite like the ordinary plant when growing; but the inflorescence is peculiar. Mr. Bennett writes: "I suppose this is an *aquatilis* form; but the glumes are very dark, and much like the *mutica* forms of *salina*."—*C. pilulifera* L. var. *longebracteata* Lange. 94. Ben Avon, up to about 3500 ft.—*C. verna* Chaix. *94. Not uncommon on the lower ground; ascending to 1400 ft. near Inchrory.—*C. pallescens* L. *94. Avon and Conglass Valleys.—*C. capillaris* L. 94. Apparently very scarce on limestone above Inchrory (1400 ft.); confirms the county record.—*C. sylvatica* Huds. *94. Sparingly on wooded limestone about Bridge of Avon, at 1000 ft. or thereabouts.—*C. Hornschuchiana*

Hoppe. *94. Frequent. — *C. lepidocarpa* Tausch. *94. Plentiful and fine, especially on the limestone.—*C. Hornschuchiana* × *lepidocarpa* grows with the parents a little above Ruthven Bridge. — *C. Ederi* Retz. var. *ædocarpa* And. is pretty general in the district.

Phalaris arundinacea L. 94. Only seen by the Avon at one spot; here it was remarkably luxuriant (up to 7 ft. high, with stem-leaves up to three-quarters of an inch broad).

Agrostis palustris Huds. var. *coarctata* (Hoffm.). 94. Stream-sides in two or three places, sparingly.

Avena pratensis L. var. *longifolia* (Parn.). 94. In profusion on a shingly island in the Avon; occasionally on limestone among bushes.

Koeleria gracilis Pers. subsp. *britannica* Domin. 94. Rare about Tomintoul, ascending to 1100 ft. Some specimens are our usual British plant, which has hitherto been called *K. cristata* Pers.; others approach typical *gracilis* in habit.

Melica nutans L. 94. Limestone cliffs above Bridge of Avon, and rocks by the Builg Burn; in small quantity. Confirms the record for Banff.

Poa alpina L. *94. Great corrie of Ben Avon; viviparous.—*P. nemoralis* L. var. *divaricata* Syme. 94. Gorge of the Water of Ailnack; limestone cliffs above the Avon.

Glyceria declinata Bréb. *92. Cock Bridge. *94. Swamps in the valleys. *96. Glen Brown.

Agropyron caninum Beauv. Scarce in thickets on limestone, ascending to 1000 ft.

Cystopteris fragilis Bernh. var. *dentata* Hooker. 94. Gorge of the Ailnack Water, &c. Some remarkable forms (or perhaps rather states) of this variable species were found on shaded limestone rocks near the Avon.

Lastræa spinulosa Presl. *94. Damp shady places in the valleys.

Lycopodium alpinum L. var. *decipiens* Syme. 94. Great corrie of Ben Avon, at fully 3000 ft., with *L. annotinum*.

Nitella opaca Agardh. 94. Pool near the Builg Burn; ditch and pool in the Conglass Valley.

MYCETOZOA OF THE SOUTH MIDLANDS.

BY JAMES SAUNDERS, A.L.S.

It may be expedient to preface these notes with the statement that the organisms known as the Mycetozoa pass through several well-defined stages in accomplishing their life cycle. These are respectively, spores, amœba-like cells, plasmodium, and sporangia. The plasmodium is the principal agent of assimilation, and it is necessary that during this stage sufficient formative material should be absorbed for the purposes of fructification, which is the next phase in their life-history.

There are apparently other and unknown causes which affect the distribution and recurrence of certain species. It sometimes happens that a form which has been very abundant for several consecutive seasons disappears for an indefinite period. Although there is no apparent change in the conditions from those that existed in the period of their abundance, yet close and frequent inspection of their formerly favourite habitats fails to reveal their presence. It is the purpose of the following communication to illustrate this statement, by recording examples of such phenomena that have been observed over an area within a radius of ten miles from Luton, which includes portions of Beds, Bucks, and Herts.

A remarkable example is that of *Didymium Trochus*, which was first observed in the spring of 1897 at Chaul End, Beds, and was figured and described in this Journal for 1898 (t. 386, fig. 1, p. 164) by Mr. Lister. During the following summer it was noticed in numerous stations. In October, 1897, Mr. C. Crouch first detected the plasmodium of the species in a heap of refuse taken from arable land. In the fruiting stage it was generally distributed over the area under consideration, thus presenting an example of a species, hitherto unknown to science, occurring in great numbers in various localities, scattered over several square miles. It may be questioned whether it had reappeared after a period of quiescence, or whether its usual habitats had not been carefully examined.

From 1897 to 1902 *Didymium Trochus* was of frequent occurrence each summer and autumn, so much so that it ceased to be an object of special interest to local observers. In 1899 it was abundant also at Ivinghoe, Bucks, so that its known area of distribution in this district extended from Ivinghoe to Luton, ten miles west to east, and northwards to Pullox Hill, about eight miles. It was also in the early spring of 1897 that Mr. E. S. Salmon first noticed *D. Trochus* near Reigate, but in small quantity only (Journ. Bot. l. c.).

From the summer of 1902 to that of 1905, there was no local record of its appearance. It was sought for diligently and with persistent effort especially during 1904, its previous well-known haunts being subjected to close inspection. Other forms were seen in plenty, but no *D. Trochus*. In July, 1905—that is, after an interval of three years—it was again found in good condition and fair quantity in a rick-yard at the foot of the Streatley Hills, Beds, well within the area over which it had been previously observed. At a second visit a fortnight later, it was again seen at the same place, just prior to the destruction of the straw-heap in connection with harvesting operations. The characters of the species were well maintained in these gatherings.

A somewhat similar experience can be recorded in connection with *Chondrioderma testaceum*. Previously to 1894, the date of the issue of Mr. Lister's monograph, this species was recorded for Britain only from Moffat, Scotland, and Flitwick, Beds; the latter station is a damp wood of only a few acres in extent, situated on Flitwick Moor, which is upon the Lower Greensand. The

surrounding district is so flat that effective drainage, if practicable, would be very costly. During the autumn, both of 1896 and 1897, *C. testaceum* was so abundant over many parts of the wood that hardly a step could be taken without crushing numerous sporangia. It continued to appear in diminishing numbers till 1899, since which period it has been entirely absent, or, if present, only in such small quantities as to escape notice under careful scrutiny. This is a comparatively conspicuous species, as its pinkish white sporangium-walls show in contrast with the dead leaves and twigs which form its usual habitat.

In like manner *Physarum contextum* was abundant in several parts of Flitwick Wood from 1893 to 1896; since the latter date it has been absent, or extremely rare. In the visits to this place in recent years this form has been made an object of special search, but always without success. It is possible that the diminished rainfall of several successive years previous to 1903 may have rendered the wood less adapted to the development of this species and also of *Chondrioderma testaceum*. There were no apparent local causes, such as felling trees, or effective draining, to produce the effects just described.

Another illustration is afforded by *Physarum straminipes*, which, until observed in this district, was undescribed. It was first detected on May 2nd, 1897, and during that spring and the summer following it was abundant and generally distributed in this neighbourhood. Although closely allied to *P. compressum*, it is readily distinguished in the field when once the external differences of the two species are appreciated. For several successive seasons it was of common occurrence, so that its appearance in its usual haunts evoked no comment. From 1902 to the spring of 1905, however, no example was observed, although its favourite stations were carefully examined, and were found to be rich in other forms of this genus. In May, 1905, a small quantity was found near Stopsley, Beds, which was the first record after an interval of three years, and the only one during that year.*

In the allied genus *Badhamia*, *B. nitens* was plentiful, both in the plasmodium and fruiting stages, during the years 1892-1894 in two damp woods, principally of oak trees, near Caddington, Beds. Since 1897 no example has been found in either locality, although frequent search has been made. One of these woods, that in which it had been most abundant, has been made the object of periodic visits for eight or nine years, but it has yielded no trace of this species, although other forms have continued to appear with interesting regularity. There was no apparent change in its environment, which was a damp wood, with a profuse undergrowth of brambles, and numerous fallen decayed oak branches, which were formerly the special habitats of this species. In the year 1899 *B. nitens* was plentiful in a wood in Woburn Park. The only

* *P. straminipes* has also been observed this spring (1906) at Leagrave, Beds, on April 8th.

other local record for this species was in January, 1905, when it was found in a wood at Chiltern Green, in small quantity only. This station is about three miles from the Caddington Woods, where formerly it was so abundant.

Chondrioderma radiatum, a species usually found on decayed wood, was for several years subsequent to 1892 generally distributed and constant in appearance. Since 1898 there is no record for this district, and as it is a species of wide distribution, its reappearance would be noted with interest.

Somewhat analogous to the foregoing are the habits of certain species that appear only occasionally, or at least are but rarely observed in this district.

Subjoined is a list of the more noteworthy species that have been found in one locality only, and most of them on a single occasion during the period extending from 1892 to 1905 :—

- Badhamia macrocarpa*, Kitchen End, Beds, 1894.
- B. lilacina*, Flitwick, Beds, 1896.
- B. foliicola*, Chaul End, Beds, 1900.
- Physarum leucopus*, Ivinghoe, Bucks, 1894.
- P. psittacinum*, Ivinghoe, 1895.
- Chondrioderma niveum*, Flitwick, 1896.
- Diachea subsessilis*, Flitwick, 1896-7.
- Lamproderma physaroides*, Flitwick, 1894.
- L. violaceum*, Luton Hoo, Beds, 1893.
- Cribraria violacea*, Ivinghoe, 1893-4.
- Amaurochaete atra*, Sundon, Beds, 1904.
- Enteridium olivaceum*, Pepperstock, Beds, 1896.
- Perichaena variabilis*, Kitchen End, 1891-3.
- Margarita metallica*, Ridgmont, Beds, 1894.
- Prototrichia flagellifera*, Flitwick, 1894.
- Lycogala flavo-fuscum*, Kitchen End, 1895, 1897, 1899.

In contrast with the habits of those species which are rarely seen are others which are of general distribution, and may be found at nearly all seasons. Amongst these it would seem that *Didymium difforme* and *D. effusum* are easily first; both of these are frequent in moist woods and refuse-heaps that have been undisturbed for several months. Individual groups of these species attain maturity at all seasons of the year. Other forms that approach them in respect to frequency and regularity of appearance are *Physarum nutans*, *Badhamia utricularis*, *Trichia varia*, *T. fallax*, *T. Botrytis*, and *Lycogala miniatum*. These are denizens chiefly of woodlands and decayed tree-stumps in ancient hedgerows. Representatives of most of these species are to be found at all periods of the year, except during extreme variations of temperature. Excessive drought and prolonged frost are potent causes in arresting their development.

In further illustration of the suggestion that the distribution of the Mycetozoa is largely governed by environment, it is noteworthy that certain forms are found only on decayed wood. In the district under consideration, which no doubt reflects the characters of

more extended areas, the following species are subject to these conditions:—

<i>Ceratiomyxa mucida.</i>	<i>Tubulina fragiformis.</i>
<i>Amaurochaeta atra.</i>	<i>Dictydæthaliæ plumbeum.</i>
<i>Brefeldia maxima.</i>	<i>Reticularia Lycoperdon.</i>
<i>Lindbladia Tubulina.</i>	<i>Lycogala miniatum.</i>
<i>Enteridium olivaceum.</i>	<i>L. flavo-fuscum.</i>

With the exception of *Ceratiomyxa*, all these form æthalia.

The genera *Trichia*, *Arcyria*, and *Cribraria* are noteworthy in that they are not recorded for straw-heaps. Others characteristic of decaying straw, although not limited to such situations, are:—

<i>Badhamia ovispora.</i>	<i>Fuligo ellipsospora.</i>
<i>Physarum straminipes.</i>	<i>Didymium Trochus.</i>
<i>P. didermoides.</i>	<i>Spumaria alba</i> var. <i>dictyospora.</i>
<i>P. didermoides</i> var. <i>lividum.</i>	

These are sometimes found in great numbers, the straw being in places whitened with the calcareous sporangia. The only species apparently limited to these situations is *D. Trochus*. *Badhamia ovispora* has been recorded for the United States, also in association with straw-heaps.

Our knowledge of the general distribution of the Mycetozoa is being gradually increased by the observations of travellers in remote regions; several lists from distant lands have appeared in this Journal in recent years, and a comparison of these records with those from the South Midlands may not be without interest. The eighteen species in the list of Japanese Mycetozoa (Journ. Bot. 1904, 97) include thirteen that are recorded also for the South Midlands. Of these, *Physarum compressum*, *P. didermoides*, *Didymium effusum* (aggr.), and *D. nigripes* (aggr.) are frequent in decaying straw-heaps in this district, but only one of them, *P. didermoides*, can be said to be characteristic of these situations.

Of the thirty-eight forms enumerated in the interesting account of some New Zealand species (Journ. Bot. 1905, 111), thirty-one are found in this district. The large majority of these are in New Zealand, denizens of woodlands, in this respect agreeing with their habits in this country. The list of fifty-three species observed in the islands of Antigua and Dominica by Mr. Wm. Cran (Journ. Bot. 1898, 378) includes thirty-five which occur also in this vicinity.

From the data furnished by these lists it is evident that many species of Mycetozoa have almost a world-wide distribution. Such an extended area of distribution suggests great facilities for the dispersal of the spores.

Brief and incomplete as are these observations, probably sufficient material has been presented to indicate that there is room for original investigation in noting the habits, and in working out both the local and general distribution of the Mycetozoa.

MOSSES AND HEPATICS OF CARDIGANSHIRE.

BY THE REV. W. H. PAINTER.

THE Mosses and Hepatics included in the following lists were gathered by Dr. Salter, of University College and Aberystwith, and myself, chiefly in 1903 and 1904. All that have been collected by him have S. placed against them, to distinguish them from those for which I am responsible.

All the *Sphagna* have gone through the hands of Mr. E. C. Horrell, F.L.S., who has kindly examined them, and in many instances named them; and I am indebted to Messrs. H. N. Dixon, F.L.S., W. P. Hamilton, and J. A. Wheldon, F.L.S. (especially Mr. Hamilton) for great assistance cheerfully rendered by them in examining the other mosses for me.

Dr. Salter has submitted the Hepatics gathered by him to Mr. W. H. Pearson, F.L.S., and I am indebted to the Revs. Canon Lett and C. H. Waddell for much assistance connected with the determination of the plants that I gathered.

The altitudes given have been taken for the most part from the one-inch map of the county, published by the Ordnance Survey.

I have followed Mr. Horrell's *Handbook* in the nomenclature of the *Sphagnaceæ*; Mr. Dixon's *Handbook of British Mosses* for that of the mosses; and Mr. Macvicar's *Census Catalogue* for that of the hepatics. The existence of fruit has been marked by the symbol "fr."

Sphagnum fimbriatum Wils. Llyfnant Valley, 200 ft. — *S. quinquefarium* Warnst., var. *virescens* Warnst. Llyfnant Valley. — *S. subnitens* Russ. & Warnst. Plynlimmon, 1000 ft., S.; Devil's Bridge, 800 ft.; Llyfnant Valley; Llancynfelin, fr., 50 ft. — Vars. *flavorangeum* Warnst. and *violascens* Warnst. Llyfnant Valley. — *S. squarrosum* Pers., vars. *spectabile* Russ. and *subsquarrosum* Russ. Llyfnant Valley. — *S. teres* Angstr. Llyfnant Valley. — *S. inundatum* Warnst. Ty Gwyn, near Aberystwith, and Llyfnant Valley. — *S. rufescens* Warnst. Llancynfelin. — *S. cymbifolium* Warnst. Llyfnant Valley. — *S. papillosum* Lindb. Near Aberystwith. — Var. *normale* Warnst. Llancynfelin.

Andræa petrophila Ehrh. Nant Myherin, 1500 ft. — *A. Rothii* W. & M. Nant Myherin, fr. — Var. *falcata* Lindb., Nant Myherin, fr., 1000 ft.

Tetraphis Browniana Grev. Clettwr Valley, S.; 800 ft.

Catharina undulata, W. & M. Ascends up 200 ft.

Polytrichum nanum Neck. Monk's Cave, fr., 100 ft.; S. — *P. aloides* Hedw. Llyfnant Valley, Cwm Woods, Ceulan Valley, and Nant Eos; in fr. at all habitats. — *P. urnigerum* L. Cwm Woods, Aberystwith. — *P. piliferum* Schreb. Aberystwith, 200 ft.; Llancynfelin. — *P. juniperinum* Willd. Rocks, Aberystwith; Devil's Bridge, 650 ft.; Llyfnant Valley. — *P. formosum* Hedw. Plynlimmon, S.; Llyfnant Valley; Nant Eos, fr., 200 ft. — *P. commune* L. Nant Myherin, 1000 ft., fr.

Diphyscium foliosum Mohr. Between Talybont and Dolybont, fr., 200 ft.; S.—Var. *acutifolium* Lindb. Nant Myherin, S.

Pleuridium axillare Lindb. Aberystwith, S.

Ditrichum homomallum Hampe. Camddwr Valley, 1250 ft.; S.

Ceratodon purpureus L. Ascends up to 200 ft.

Rhabdoweissia fugax B. & S. Nant Myherin, 1000 ft., fr.; S.—*R. denticulata* B. & S. Nant Myherin, S.

Cynodontium Bruntoni B. & S. Plynlimmon, S.; Nant Myherin, 1000 ft.

Dicranella heteromalla Schimp. Ascends up to 1000 ft.—*D. curviculata* Schimp. Borth Bog, fr.; S.—*D. varia* Schimp. Wallog, 30 ft., S.—*D. squarrosa* Schimp. Llyfnant Valley; Nant Myherin, 1000 ft.

Blindia acuta B. & S. Nant Myherin, 1000 ft.

Dicranoweissia cirrata Lindb. Llyfnant Valley, fr.; South Beach, S.; near Nant Eos.

Campylopus pyriformis Brid. Borth Bog, S.—*C. flexuosus* Brid. Plynlimmon; Nant Myherin, 1000 ft., S.; Llyfnant Valley; Llancynfelin, var.—*C. atrovirens* De Not.—Llyfnant Valley; Nant Myherin, 1000 ft.

Dicranum Bonjeani De Not. Plynlimmon, 2000 ft., S.—*D. scoparium* Hedw. Ascends up to 1000 ft.—Var. *paludosum* Schimp. Nant Myherin, 1000 ft.—Var. *orthophyllum* Brid. Plynlimmon, 2000 ft., S.—Var. *spadiceum*, Boul. Llancynfelin.—*D. majus* Turn. Ascends to 800 ft.

Leucobryum glaucum Schimp. Ascends to 1000 ft.

Fissidens bryoides Hedw.; fr. Ascends to 1000 ft.—*F. osmundoides* Hedw. Nant Myherin, 1000 ft., S.—*F. adiantoides* Hedw. Clettwr Valley, 450 ft.; Bwlch-y-gareg, 1250 ft., S.; Nant Eos, fr.—*F. taxifolius* Hedw. Pen Dinas; Devil's Bridge; Llyfnant Valley, fr.

Grimmia apocarpa Hedw. Near Aberystwith, fr.; Llyfnant Valley, fr.; Wallog Wood, S.—Var. *rivularis* W. & M. Llyfnant Valley, fr.; Nant Myherin.—*G. maritima* Turn. Rocks south of Aberystwith, fr.—*G. pulvinata* Sm. Ascends up to 150 ft., fr.—*G. Doniana* Sm. Nant Myherin; Yr Garreg, fr., 1250 ft.; S.—*G. trichophylla* Grev. Bow Street, S.; Constitution Hill, Aberystwith, S.; Llancynfelin.

Racomitrium aciculare Brid. Llyfnant Valley, fr.; Bwlch-y-gareg, 1250 ft., S.; Nant Myherin.—*R. protensum* Braithw. Llyfnant Valley; Devil's Bridge; Nant Myherin, 1000 ft.—*R. fasciculare* Brid. Bwlch-y-gareg, 1250 ft., S.; Nant Berwyn, 1100 ft.; Tregaron, S.; south of Aberystwith; Llyfnant Valley, fr.—*R. lanuginosum* Brid. Ascends up to 1500 ft., fr.; S.—*R. heterostichum* Brid. Ascends up to 800 ft., fr.

Ptychomitrium polyphyllum Fürnr. Ascends up to 800 ft., fr.

Pottia Heimii Fürnr. Llanbadarn Fawr, fr.—*P. intermedia* Fürnr. Pen Glais, near Aberystwith, fr., S.—*P. crinita* Wils. South Beach, Aberystwith, fr., S.—*P. truncatula* Lindb. Wallog, and Cwm, near Aberystwith, fr., S.

Tortula muralis Hedw. About Aberystwith.—Var. *rupestris*

Hedw. Near Aberystwith, fr., 200 ft.—*T. subulata* Hedw. Llanbadarn Fawr, fr. — *T. ruraliformis* Dixon. South of Aberystwith. — *T. lævipila* Schwaegr. Hen Gaer, fr., 500 ft.; S.

Barbula rubella Mitt. Ascends up to 200 ft., fr. — *B. rigidula* Mitt. Aberystwith, fr.; Devil's Bridge.—*B. convoluta* Hedw. South of Aberystwith, fr.—*B. unguiculata* Hedw. Ascends up to 600 ft., fr.; S.—*B. tophacea* Mitt. South of Aberystwith.

Weissia viridula Hedw. Ascends up to 200 ft., fr.; S.

Trichostomum crispulum Bruch. Devil's Bridge, 800 ft. — *T. tortuosum* Dixon. Devil's Bridge; Nant Myherin, 1000 ft.

Encalypta vulgaris Hedw. Wallog, 150 ft., S. — *E. streptocarpa* Hedw. Near Aberystwith, 150 ft.

Zygodon Mougeotii B. & S. Llyfnant Valley.

Orthotrichum anomalum Hedw. Llanbadarn Fawr, 100 ft. — *O. leiocarpum* B. & S. Near Aberystwith. — *O. affine* Schrad. Nant Eos; Hen Gaer, 500 ft., S.; Wallog, S. — *O. diaphanum* Schrad. Walls, Aberystwith.

Ulota phyllantha Brid. Nant Eos; Llancychaiarn.

Splachnum sphæricum L. Nant Myherin, fr.; Llyn Eiddwen; Mynydd Bach, fr., 1200 ft.; S.

Tetraplodon mnioides B. & S. Plynlimmon, 1000 ft., S.

Physcomitrium pyriformis Brid. Aberystwith, fr., S.

Fumaria hygrometrica Sibth. South of Aberystwith and Clannach.

Aulacomnium palustre Schwaegr. Ascends to 1000 ft., S. — *A. androygnum* Schwaegr. Plynlimmon, 1000 ft., S.; Nant Myherin.

Bartramia pomiformis Hedw. Devil's Bridge; Nant Myherin; Llyfnant Valley.

Philonotis fontana Brid. Ascends up to 800 ft., fr.

Breutelia arcuata Schimp. Llyfnant Valley; Devil's Bridge; Nant Myherin; Plynlimmon, S.

Webera elongata Schwaegr. Bwlch-y-gareg, fr., 1250 ft.; S. — *W. cruda* Schwaegr. Bwlch-y-gareg, fr., S. — *W. nutans* Hedw. Ascends up to 800 ft. — *W. albicans* Schimp. Pen Park, and Nant Eos, fr.; near Aberystwith; Nant Myherin.

Bryum pendulum Schimp. Near Nant Eos, fr.—*B. pallens* Sw. Near Aberystwith; Devil's Bridge, fr. — *B. bimum* Schreb. Nant Eos, fr.—*B. pseudo-triquetrum* Schwaegr. Nant Eos; Nant Myherin, fr.—*B. capillare* L. Ascends up to 200 ft., fr. — *B. erythrocarpum* Schwaegr. Walls near Aberystwith, fr. — *B. atropurpureum* W. & M. Rhydyfelin; near Aberystwith, fr. — *B. argenteum* L. Nant Eos, fr., 150 ft.—*B. alpinum* L. Bwlch-y-gareg, 1250 ft., S.; Llancynfelin, 50 ft.—*B. roseum* Schreb. Cwm Woods, Aberystwith, 100 ft., S.

Mnium cuspidatum Hedw. Nant Eos, near Aberystwith; Llyfnant Valley.—*M. rostratum* Schrad. Nant Eos, fr.; Cwm Woods. — *M. undulatum* L. Nant Eos, fr.—*M. hornum* L., fr. Ascends to 1250 ft.—*M. punctatum* L. Llyfnant Valley, fr.

Fontinalis antipyretica L. Pen Parc, near Aberystwith; Bwlch-y-gareg, 1250 ft.; Llyfnant Valley. — *F. squamosa* L. Llyfnant Valley; Nant Myherin, 800 ft.

Neckera crispa Hedw. Ravine, River Rheidol, 900 ft., S.; Devil's Bridge; Nant Myherin; Llyfnant Valley. — *N. complanata* Hübner. Bryn Eitlin, 150 ft.; near Aberystwith, 250 ft., S.

Pterygophyllum lucens Brid. Llyfnant Valley; Cwm Woods, Aberystwith; near Talybont, 200 ft., fr.; Bwlch-y-gareg, 1250 ft., S.

Porotrichum alopecurum Mitt. Cwm Woods; Bwlch-y-gareg; Talybont, S.; Llyfnant Valley.

Heterocladium heteropterum B. & S. Nant Myherin; Bwlch-y-gareg, 1250 ft., S.

Thuidium tamariscinum B. & S. Cwm Woods, fr., S.; Llyfnant Valley.

Isothecium myurum Brid. Llyfnant Valley.

Pleuropus sericeus Dixon. Near Aberystwith, fr.

Brachythecium rutabulum B. & S. Ascends up 900 ft., fr.; S. — *B. rivulare* B. & S. Llyfnant Valley. — *B. plumosum* B. & S. Bwlch-y-gareg, 1500 ft., S.; Llyfnant Valley. — *B. velutinum* B. & S. Ascends up to 200 ft., fr. — *B. purum* Dixon. Ascends up to 200 ft.

Hyocomium flagellare B. & S. Clettwr Valley, 450 ft.; Nant Myherin, 800 ft., S.; Llyfnant Valley.

Eurhynchium praelongum B. & S. Cwm Woods, fr.; Parson's Bridge, 900 ft., fr. — *E. teneilum* Milde. Rhydyfelin, near Aberystwith, 200 ft., S. — Var. *meridionale* Boul. Llyfnant Valley (named by Mr. Dixon). — *E. myosuroides* Schimp. Llyfnant Valley, fr., and woods. — *E. striatum* B. & S. Cwm Woods, fr.; Nant Eos; Llyfnant Valley; Devil's Bridge. — *E. rusciforme* Milde. Talybont, fr., 200 ft., S.; near Nant Eos; Llyfnant Valley. — *E. confertum* Milde. Monk's Cave, S.; Cwm Woods, near Aberystwith, 150 ft.

Plagiothecium Borrerianum Spr. Cwm Woods; Nant Myherin, 900 ft. — *P. pulchellum* B. & S. Nant Myherin, fr., 800 ft. — *P. denticulatum* B. & S. Ascends up to 800 ft. — *P. undulatum* B. & S. Llyfnant Valley, fr.; Devil's Bridge, 800 ft.

Amblystegium serpens B. & S. Nant Eos, fr. Ascends up to 150 ft.

Hypnum stellatum Schreb. Nant Myherin, 800 ft. — *H. revolvens* Sw. Nant Myherin, 800 ft. — *H. commutatum* Hedw. Cwm Woods, 150 ft. — *H. cupressiforme* L., fr. Ascends up to 1000 ft. on Plynlimmon, S. — Var. *jiliforme* Brid. Nant Eos, fr.; Cwm Woods. — Var. *minus* Wils. Cwm Woods. — Var. *ericetorum* B. & S. Beach south of Aberystwith. — Var. *tectorum* Brid. Cwm Woods. — Var. *elatum* B. & S. Pen Dinas; Aberystwith; Trevecham, 150 ft. — *H. molluscum* Hedw. Nant Eos; Llyfnant Valley; Bwlch-y-gareg, 1250 ft., S. — Var. *condensatum* Schimp. Nant Myherin, 1000 ft. — *H. scorpioides* L. Ty Llwyd Pond; Llanfariew, S.; Nant Myherin, 1000 ft. — *H. ochraceum* Turn. Llyfnant Valley; Ceulan Valley, 435 ft.; Nant Myherin, 1000 ft.; Bwlch-y-gareg, 1250 ft., S. — *H. sarmentosum* Wahl. Ceulan Valley, 1000 ft., S. — *H. Schreberi* Willd. Ascends up to 200 ft. — *H. cuspidatum* L. Ascends up to 200 ft.

Hylocomium splendens B. & S. Beach south of Aberystwith, S.; Llyfnant Valley, fr. — *H. loreum* B. & S. Cwm Woods; Llyfnant Valley, fr. — *H. squarrosum* B. & S. Heaths. — *H. triquetrum* B. & S. Ascends up to 200 ft., fr.

HEPATICS.

The nomenclature and sequence are those of Mr. Macvicar's Catalogue, the catalogue used by the Moss Exchange Club.

Riccia Lescuriana Aust. Craig-y-Pistyll, S.

Conocephalum conicum Dum. Near Aberystwith, 100 ft.

Lunularia cruciata Dum. Llangorwen; Nant Eos, S.

Marchantia polymorpha L. Llyfnant Valley, 200 ft.

Aneura pinguis Dum. Everywhere, S. — *A. multifida* Dum. Abundant, S. — Var. *ambrosioides* Nees. Nant Myherin, S. — *A. latifrons* Lindb. Llyfnant Valley.

Metzgeria furcata Lindb. Llangorwen; Nant Eos, S.

Pellia epiphylla Dum. Abundant.

Blasia pusilla L. Glan-yr, Afon, S.

Marsupella emarginata Dum. Tregaron; Nant Myherin, S.

Nardia scalaris Gray. Tregaron, S.; North Rheidol and Nant Eos. — *N. hyalina* Carr. Near Monk's Cave, S. — *N. obovata* Carr. Cwm Woods, S.

Aplozia crenulata Dum. Cwm Woods. — Var. *gracillima* (Sm.). Cwm Woods; Llyfnant Valley. — *A. sphærocarpa* Dum. River Ystwith, S. — *A. riparia* Dum. Tregaron, S.

Lophozia ventricosa Dum. Nant Myherin, S. — *L. excisa* Dum. River Rheidol, S. — *L. quinquedentata* Cogn. Devil's Bridge, S.; Llyfnant Valley. — *L. Floerkii* Schiffn. Tregaron, S.

Plagiochila punctata Tayl. Nant Myherin, S. — *P. asplenoides* Dum. Llyfnant Valley; Devil's Bridge, &c. — Var. *Dillenii* (Tayl.). Nant Myherin, S.

Lophocolea bidentata Dum. Cwm Woods, S.; Bow Street, near Aberystwith. — *L. cuspidata* Limpr. Cwm Woods, S. — *L. heterophylla* Dum. River Rheidol, S.

Chiloscyphus polyanthos Corda. River Ystwith, S.; Llyfnant Valley.

Saccogyna viticulosa Dum. Clettwr Valley, S.

Cephalozia bicuspidata Dum. Cwm Woods, S. — *C. Lammersiana* Spruce. Borth Bog, S. — *C. connivens* Spruce. Borth Bog, S. — *C. lunulæfolia* Dum. Borth Bog, S.

Hygrobiella laxifolia Spruce. Clettwr Valley, S.

Odontoschisma Sphagni Dum. Borth Bog, S.

Kantia Trichomanis Gray. Borth Bog, S. — *K. Sprengelii* Pears. Cwm Woods, S. — *K. arguta* Lindb. Clettwr Valley, S.

Lepidozia reptans Dum. Llyfnant Valley; Nant Myherin. — *L. setacea* Mitt. Borth Bog, S.

Herberta adunca Dicks. Near Parson's Bridge, S.

Ptilidium ciliare Hampe. Head of Nant Rhyddvant, S.

Trichocolea tomentella Dum. Woods near Talybont, S.; Llyfnant Valley.

Diplophyllum albicans L. Ascends up to 700 ft.

Scapania compacta Dum. Cwm Woods; Devil's Bridge; Tregaron, S. — *S. gracilis* Kaal. Llyfnant Valley; Devil's Bridge, 700 ft. — *S. purpurascens* Tayl. Ceulan Valley, S.; Llyfnant Valley. — Var. *speciosa* Nees. Bwlch-y-gareg, 1250 ft., S.; Llyfnant Valley. — *S. intermedia* Pears. Cwm Woods; Llyfnant Valley.

Radula complanata Dum. Cwm Woods, S.

Lejeunia cavifolia Lindb. Cwm Woods, S. — *L. patens* Lindb. Cwm Woods, S.

Frullania Tamarisci Dum. Cwm Woods, S. ; Llyfnant Valley ; Devil's Bridge. — *F. dilatata* Dum. Cwm Woods, S. ; near Nant Eos ; Llyfnant Valley.

Anthoceros lævis L. Nant Eos, S. ; Bow Street, near Aberystwith.

SOME PLANTS OF THE ENGLISH LAKE DISTRICT.

By A. LEY, M.A., AND W. R. LINTON, M.A.

THREE counties are involved in these notes—Cumberland (70), Lake Lancashire (69), and Westmoreland (69), indicated respectively by their initial letters. Records additional to Mr. Baker's *Flora of the Lake District*, Top. Bot. ed. ii., and Mr. Bennett's Supplement thereto in this Journal for 1905, have an asterisk prefixed.

Thalictrum Kochii Fr. In considerable abundance on the banks of Great Langdale Beck (W.), and River Brathay (W. and L.). The plant, though a good deal galled, showed clearly the ovoid carpels. — *Caltha palustris* L. var. *minor* Syme. Above Angle Tarn (C.), and other places.

Cochlearia alpina H. C. Wats. Scandale, Ambleside, and Rydal Beck (W.). — *Brassica Rapa* L. var. *Briggsii* H. C. Wats. At Clappersgate, near Ambleside (W.). — *Teesdalia nudicaulis* R. Br. Great Langdale Beck, on stony ground (W.).

Viola lutea Huds. var. *amæna* (Symons). On Dollywaggon Pike (W.).

**Steilaria aquatica* Scop. Between Chapel Stile and Little Langdale, in a lane (W.).

Arenaria verna L. Dollywaggon Pike (W.).

Spergula arvensis L. var. *vulgaris* Boenn., and var. *sativa* Boenn. About Chapel Stile and Great Langdale (W.).

Rhamnus Frangula L. By River Brathay (W.).

The following Rubi were all submitted to Rev. W. Moyle Rogers, who kindly looked them over, and named them, or assented to their names. With regard to a few of the most common species, such as *R. rusticanus*, *leucostachys*, and *cæsius*, no notes were taken.

R. jissus Lindl. Upper Langdale, in several stations (W.). — *R. suberectus* And. Between Ambleside and Skelwith Bridge (W.). — **R. plicatus* W. & N. f. Upper Langdale (W.). — Var. **Bertramii* G. Braun. Margin of Elter Water (L.). — *R. nitidus* W. & N., subsp. **opacus* Focke. Plentiful along marshy sandy stream-sides at the heads of Great and Little Langdale (W. and L.). — **R. Rogersii* Linton. Great and Little Langdale heads (W.) ; Skelwith Bridge (L.). — **R. incurvatus* Bab. Tilberthwaite (L.). — **R. Scheutzii* Lindeb. Skelwith Bridge, Chapel Stile, and other stations in

Great Langdale (W.); on the old road from Ambleside to Coniston (L.).—*R. pulcherrimus* Neum. One of the most frequent and finest brambles of the district. It occurred in two distinct forms—an eglandular one with white flowers, and a glandular one with larger, more ovate leaves, and pink flowers (W.). — **R. Lindebergii* P. J. Muell. Stock Ghyll Lane, and on the Coniston Road near Ambleside (W.); on the old Ambleside and Coniston Road (L.). — *R. mercicus* Bag. var. *bracteatus* Bag. Frequent near Ambleside, and between Ambleside and Coniston (L.). — *R. hirtifolius* Muell. & Wirtg. var. **danicus* Focke. Near Skelwith Bridge, Ambleside (W.). — *R. pyramidalis* Kalt. f. Little Langdale (W.); near Coniston (L.). — **R. criniger* Linton. On the old road between Ambleside and Coniston, and at Coniston Railway Station (L.). — *R. infestus* W. Frequent and well developed in the Langdales, both Great and Little (W.). — **R. Drejeri* G. Jensen. Upper Langdale, at several stations (W.). — **R. rosaceus*, sp. coll. Colwith Bridge (W.). — Var. **Hystrix* (W. & N.). On the Langdale Road, Ambleside (W.). This form, or the sp. coll., is of frequent occurrence near Ambleside. — *R. corylifolius* Sm. var. *sublustris* (Lees). Roadside near Keswick (W.).

It will be noticed in the above list how much richer the bramble flora in this part of Lakeland is in the earlier than in the later forms of our list.

Asperula cynanchica L. Abundant on Scout's Scar, Kendal (W.).

Valeriana Mikanii Syme, and *V. sambucifolia* Willd. Both about Great Langdale, near Dungeon Ghyll.

Hieracium Pilosella L. var. **concinnum* F. J. Hanb. Limestone near Scout's Scar, Keswick (W.). — *H. anglicum* Fr., type. Dove Crag, Dollywaggon Pike (W.). — Var. *jaculifolium* F. J. Hanb. Crinkle Beck, Dollywaggon Pike, Dove Crag, Rydal Beck (W.); Tilberthwaite Ghyll, Skelwith Force (L.). — *H. argenteum* Fr. Snaka Rocks, near Ambleside, Scout's Scar, Great Langdale Beck (W.). — **H. Sommerfeltii* Lindeb. On Snaka Rocks, Dove Crag, Dollywaggon Pike (W.). About three different forms were noted, all belonging to this group. — **H. orimeles* W. R. Linton. On Snaka Rocks and Pavey Ark (W.). — **H. silvaticum* L. var. *tricolor* W. R. L. Scout's Scar (W.). — Var. *subcyaneum* W. R. L. Dollywaggon Pike (W.). — Var. *prolixum* Norrlin. Dove Crag, Dollywaggon Pike (W.). Identical with the plants so named from Ben Hope, Sutherland. — **H. pellucidum* Læst. var. *lucidulum* Ley. Scandale, Ambleside (W.); Tilberthwaite Ghyll (L.). — **H. ciliatum* Alm. In the large chimney, Dollywaggon Pike (W.). — **H. serratifrons* Alm. var. *morulum* Dahlst. Dollywaggon Pike (W.). — **H. euprepes* F. J. H., var. Dollywaggon Pike (W.), 4th September, 1880. Fresh specimens in better condition are needed, to determine to which of the varieties the plant is to be assigned. — **H. casium* Fr. Above Angle Tarn (C.). — Var. *decolor* W. R. L. Above Red Tarn, Helvellyn. — **H. duriceps* F. J. Hanb. var. *cravoniense* F. J. Hanb. Tilberthwaite Ghyll, Yewdale Beck, Coniston (L.). — **H. vulgatum* Fr. var. *sejunctum* W. R. Linton. Yewdale Beck, Coniston (L.). — **H. acroleucum* Stenstr. var. *dædalolepium* Dahlst. Apparently this

plant in various places by River Brathay, above Colwith Bridge, on slate *débris* (W.); Skelwith Force, Tilberthwaite Ghyll (L.); banks of River Duddon (L.), E. Hodgson (Herb. Brit. Mus.).—**H. pinnatifidum* Lönnr. Upper Langdale (W.).—**H. irriqum* Fr. By River Brathay, above Colwith Bridge (W.); Skelwith Force (L.).—**H. sciaphilum* Uechtr. Sparingly by River Rothay, Ambleside (W.).—*H. cacuminatum* Dahlst. This form is very like *H. sciaphilum*, but has glabrous ligules and only 3–4 stem-leaves. It occurred in a small glen above Coniston Railway Station, and by the Yewdale Beck, Coniston (L.).—**H. conspersum* Dahlst. Tilberthwaite Ghyll, Yewdale Beck, Coniston (L.). A form about two feet high, lower leaves mostly withering early, with 5–7 long linear-lanceolate stem-leaves, which have a few small sharp distant teeth, peduncles floccose and somewhat glandular; heads medium, ovate, sparingly floccose and senescent, densely clothed with slender long and short glandular hairs, epilose, ligules glabrous above; styles livescent. Yewdale Beck, Coniston (L.). No description of this form has, so far as we know, hitherto been published; hence this account of it is given here.—**H. diaphanoides* Lindeb. River Brathay, above Colwith Bridge (L.).—*H. diaphanum* Fr. Skelwith Force (L.).—*H. gothicum* Fr. Rydal Beck; Mill Ghyll, Great Langdale, River Brathay, Little Langdale (W. and L.).—f. **latifolia*. River Brathay (W. and L.).—**H. stictophyllum* Dahlst. Head of River Brathay (W. and L.).—**H. sparsifolium* Lindeb. var. *strigosum* Ley. A form by River Brathay above Colwith Bridge (W.); Skelwith Force (L. and W.).—**H. corymbosum* Fr. Great Langdale Beck (W.); River Brathay (W. and L.).—Var. *salicifolium* Lindeb. In the same localities as the type, and more abundant.—*H. boreale* Fr. var. *virgultorum* (Jord.), and var. *rigens* (Jord.). Both about Lake Coniston (L.).—**H. sabaudum* L. ? Skelwith Force (L.).

Stachys palustris L. × *silvatica* L. (*ambigua* Sm.). Near Fox Howe, Ambleside, with the parents (W.).

Salix herbacea L. Crinkle Crag, above Great Langdale (W.).

**Epipactis ovalis* Bab. Scout's Scar, Kendal (W.). Found by A. Ley; a few plants.—*Habenaria chloroleuca* Ridley. Great Langdale (W.).

Juncus triglumis L. Above Angle Tarn (C.).

Carex rigida Good. Bow Fell (C.).

Deschampsia flexuosa Trin. var. *montana* Hook. fil. Crinkle Crag, above Great Langdale (W.).

Melica nutans* L. Yewdale Beck, Coniston (L.).—Glyceria declinata* Breb. Clappersgate, Ambleside, Grasmere, Little Langdale (W.); Yewdale Beck, Coniston (L.).

Poa annua L. var. *supina* Gaud. Scandale, near Ambleside, Crinkle Crag (W.).—*P. compressa* L. Quarries, Scandale, near Ambleside (W.).—*Festuca elatior* × *Lolium perenne*. Scout's Scar, Kendal (W.).—**F. silvatica* Vill. Yewdale Beck, Coniston (L.).

Selaginella selaginoides Gray. Above Angle Tarn (C.).

BOTANY AND THE LONDON COUNTY COUNCIL.

BY THE EDITOR.

THE action of the London County Council with regard to the study of Botany in schools has lately given rise to criticism both within and without that body, and as various conflicting accounts have been published, it seemed to us worth while to ascertain the facts of the case. It cannot be denied that the increase in London rates, coupled with certain costly and unremunerative experiments, such as that of the Thames steamers, has given pause to many even among the supporters of the Council; and it can hardly be matter for surprise that when—we quote from the report in the *Standard* of Feb. 28th—"The Education Committee reported that they had adopted a scheme, which had received the concurrence of the Parks Committee, involving *inter alia* the preparation of a field at Avery Hill for the purpose of a growing ground for botanical specimens, the formation of a botanical garden at Golder's Hill, and the adaptation of a portion of the wooden stabling at Avery Hill for use in connection with the collection, preparation, and distribution of botanical specimens to the schools," and stated that this would involve an expenditure of £2405—a member of the Council should have "opposed the proposal, characterizing it as wilful, wanton waste of the ratepayers' money."

In *Nature Notes* for March, the policy of the London County Council in "setting aside parts of the public parks as miniature botanical gardens," and making "provision for the cultivation of specimens for the schools" is approved; but the editor was "simply horrified at reading the following paragraph in the *Daily Express* of January 22nd." The paragraph runs:—"The Education Committee, in their report to the London County Council, recommend that the Council's gardeners be each supplied with cycles, and that they receive an allowance of one penny for every mile they ride the machines. The reason for this recommendation is thus explained: 'We are informed that large numbers of botanical specimens are collected by the wayside, that the sources of supply are in most instances remote from the railway, and that by using cycles wherever possible the collection of specimens is facilitated.'"

The results of our inquiry into these matters may be of interest to our readers.

The scheme for supplying specimens to schools arose about eight years ago, when Mr. Acland wrote to the London School Board saying that in Berlin the school authorities had an arrangement with the authorities at the Thiergarten by which cuttings, &c., were given for school use. The Board approached the Office of Works, and got leave to erect a shed in Hyde Park, and pay for one of their gardeners, who should pack specimens for them. The specimens consisted of grasses, tree cuttings, flowers, &c., and were used partly for drawing lessons and partly for "object-lessons." It was found that for "object-lessons," *e. g.*, on a flower or a tree-bud, the specimens must be done up in bundles of about sixty, so

that each child in a class could have one. It is difficult to draw the line between an "object-lesson" and a "botany lesson," and those schools which took either "botany" as a subject for the elder girls, or "systematized object-lessons" in the middle of the school, began to ask that they might have the specimens packed in some order throughout the year for teaching purposes. To do so involved picking, though not uprooting, a certain number of common flowers in the neighbourhood of London. When the London County Council came into power, the Office of Works suggested that it ought to draw from its own parks. The Parks authorities said that if the thing was to be systematically done it would be best to plant a certain number of beds at Avery Hill which the public would have access to, and which would at the same time be pretty in themselves and useful as providing such materials. In laying out part of the park at Avery Hill that has been thought of. Both provided and non-provided schools ask for the flowers, grasses, twigs, &c., for their object-lessons, and seem to find them useful. The Avery Hill grounds would have had to be laid out anyhow, and there seems to be no reason why the London County Council should not think of the schools in laying them out.

This so far as the charge of "wilful waste of the ratepayers' money" seems satisfactory enough: it remains to deal with the objections raised in *Nature Notes*; and here again the information officially supplied to us seems satisfactory.

As to the collection of botanical specimens, the greater part of the specimens are gathered from the Council's parks, privately owned gardens and lands, and until quite recently from the Royal Parks, consisting largely of the waste produce, prunings, &c. The extent to which specimens are gathered at or near roadsides is very small, and is limited almost solely to buttercups, chickweed, and shepherd's-purse, which are numerous, and of which only a few are taken. Rare plants are never taken. An undertaking not to uproot or in any way damage the character of the flora, &c., is always given whenever the permission of owners for facilities to gather specimens is sought or obtained. This rule is also rigidly observed whenever any material is taken at or near roadsides.

The statement quoted from the *Daily Express* relative to cycles is inaccurate. No cycles are supplied by the Council. The staff are allowed a rate of one penny per mile when using their own cycles in the Council's service, provided that the rate does not exceed railway fare, or if the place visited is not readily accessible by rail or other ordinary means of travelling. This rate is exactly half of the rate granted to officers of the Board of Education when making official journeys by their own cycles.

The anxiety of the Selborne Society as expressed in its organ is highly commendable, but we may take the present opportunity of expressing our surprise that that body has not shown more activity in combating the wanton destruction of roadside beauty which now prevails throughout the entire country. The disfigurement of trees and hedges, the continual paring of roadsides and scraping of hedge-bottoms—the parings and scrapings in almost

every case being thrown on the hedge-banks or on what remains of the grassy borders of the roads—the destruction, “wilful and wanton,” by local councils of almost every feature of wayside beauty, surely demands—or demanded, for it is now too late—some more active and energetic protest on the part of Selbornians, who are numerous, and number in their ranks men and women of position and influence. We cannot but feel that the Selborne Society has neglected, to the lasting detriment of the country, a great opportunity for making its influence felt, and for establishing its claims to the support of all nature-lovers.

BIBLIOGRAPHICAL NOTES.

XXXVII.—THE DATES OF HOOKER'S “BRITISH JUNGERMANNIÆ” AND “MUSCI EXOTICI.”

FEW of those who possess copies of these works are aware of their having been issued in parts. That such was the method of publication might, indeed, be inferred from the absence of systematic order in the numbering of the plates; but as to how many parts were issued, and what were the contents, date, and price of each part—these are points which cannot be ascertained by inspection of the bound volumes.

Until less than thirty years ago people were so short-sighted and so unaware of their duty to posterity that they were accustomed to destroy the paper covers of books at the time of binding, and this evil practice prevailed even in the best regulated libraries. The consequence is that now it is often extremely difficult to find out the date of publication of any particular part of a work of that period. Much trouble would have been saved to us if our predecessors had possessed sufficient foresight to adopt the now common method of printing on the back of the title-page the dates of publication of the constituent parts of the book. Another excellent method, employed in the *Journal of Botany* as early as 1864, is that of printing the date on the first page of each sheet. This method, it must be confessed, proves misleading in cases where actual publication was deferred; for instance, pages 325–434 of Seemann's *Flora Vitiensis* were not issued till February, 1873, although it would be natural to suppose that pages 325–356 were “published October 30, 1869,” and pages 357–434 were “published June 1, 1871.”

But to return to our subject, the question of the dates of the several parts of Sir William J. Hooker's *British Jungermannia* having been raised by Mr. Symers M. Macvicar, it was found that the amount of evidence available was very incomplete, consisting of no more than three original covers, an old publishers' catalogue, and a few references to early literature. It is to Messrs. Longmans, Green & Co. that we are indebted for further information. When applied to they kindly searched their records, and furnished the

following list of the dates upon which they received from their printer copies of the various parts. The dates are as follows :—

BRITISH JUNGERMANNIÆ.		MUSCI EXOTICI.	
Part	1.—April 21, 1812.	Part	1.—January 1, 1818.
„	2.—May 26, 1812.	„	2.—January 29, 1818.
„	3.—June 29, 1812.	„	3.—February 28, 1818.
„	4.—July 29, 1812.	„	4.—March 31, 1818.
„	5.—August 29, 1812.	„	5.—April 30, 1818.
„	6.—September 29, 1812.	„	6.—May 30, 1818.
„	7.—October 30, 1812.	„	7.—June 29, 1818.
„	8.—November 30, 1812.	„	8.—July 30, 1818.
„	9.—January 1, 1813.	„	9.—August 29, 1818.
„	10.—February 1, 1813.	„	10.—September 26, 1818.
„	11.—March 1, 1813.	„	11.—October 31, 1818.
„	12.—April 14, 1813.	„	12.—November 28, 1818.
„	13.—August 13, 1813.	„	13.—January 1, 1819.
„	14.—October 2, 1813.	„	14.—February 1, 1819.
„	15.—December 18, 1813.	„	15.—February 27, 1819.
„	16.—May 26, 1814.	„	16.—March 31, 1819.
„	17.—July 13, 1814.	„	17.—May 1, 1819.
„	18.—July 6, 1815.	„	18.—June 29, 1819.
„	19.—December 4, 1815.	„	19.—August 31, 1819.
„	20.—March 27, 1816.	„	20.—October 26, 1819.
„	21.—May 1, 1816.	„	21.—November 30, 1819.
„	22.—June 14, 1816.	„	22.—April 29, 1820.
		„	23.—May 1, 1820.

The following details may be of interest. In a copy of Hooker's & Taylor's *Muscologia Britannica* (1818), preserved in its original pasteboard cover in the Department of Botany of the British Museum, there is an old fly-leaf announcing "New Works on Botany, &c.," published by Longman, Hurst, Rees, Orme, and Brown. Included in it are both the books which form the subject of this note. One is described as "A Monograph of the British Jungermannia; containing a coloured figure of every Species, with its History and Description, complete in 22 Numbers, Price 8l 9s. 6d." This is a variant of the title printed in the book itself. The printing was done by J. Keymer, of Yarmouth. Most of the parts appeared on the 1st of the month. The cost of each part containing four plates was 7s. 6d. Presumably parts i.—xxi. contained plates 1–84, costing £7 17s. 6d. in all; but part xxii., besides containing the four supplementary plates, must have included the introduction, synopsis, title-page, and index, and must have cost 15s., in order to make up the total price of £8 9s. 6d., quoted above. Besides the generally known 4to edition a few large-paper copies of folio size were issued.

The first part of the other book is described in the above-mentioned fly-leaf as follows :—"Musci Exotici; Containing Figures and Descriptions of new or little known Foreign Mosses, and other Cryptogamic Plants, by William Jackson Hooker, F.R.A. & L.S. No. 1 (Plantæ Humboldtianæ), price 3s."; and the following note is appended :—"This work is intended to comprise such exotic cryptogamic subjects, exclusive of the ferns, as have been noticed, or are imperfectly described, by preceding Naturalists. In those

cases where the author has been favoured by collections of considerable extent made by any individual Botanist, they will be distinguished from the miscellaneous collections by an additional title, as 'Plantæ Humboldtianæ,' 'Plantæ Menziesianæ,' and with a distinct Index; so that they may be bound separately, or incorporated with the rest of the work, according to the option of the possessor." These distinct indexes have no doubt disappeared with the covers in most bound copies; traces, however, of the author's grouping of the plates according to the collectors of the specimens are preserved in the headings of the pages of text which explain the plates, as, for instance, "Musci Exotici.—Menziesiani."

The *Musci Exotici* was printed by Richard and Arthur Taylor, Shoe Lane. Vol. i. (1818) contains parts i.—xii., and plates 1–96; and vol. ii. (1820) contains parts xiii.—xxiii., and plates 97–176. It appears that eight plates were issued in each of the first twenty-two parts, but presumably part xxiii. consisted of text only (thirty-one pages), namely, an "Appendix containing Specific Characters of the Mosses described in this Work, systematically arranged, with Corrections and additional Remarks," two groups only of cryptogams being included—Musci Calyptrati and Hepaticæ. If the price of each part was 3s., the total cost of the whole work was presumably £3 9s. But we may infer that the plates in this case were uncoloured; for it is stated in Lowndes's *Bibliographer's Manual of English Literature* that the work was published in two sizes and at a greater cost:—(1) 8vo, price £8 8s.; (2) 4to, large paper, price £9 4s. The plates in these editions were of course coloured by hand, and the price of each part must have been about 7s. and 8s. respectively.

ANTONY GEPP.

SHORT NOTES.

PERENNATION OF GAGEA LUTEA.—This plant is locally common in some of our Oxfordshire woods in the Ray and Isis districts, but (as in Lightfoot's locality near North Leigh) is a very shy flowerer. Last year, out of many thousand plants, probably not a score flowered, and none of these set seed. This year I could only find two in flower, and neither of these would perfect seed; yet apparently the ground was covered with tufts of young seedlings. This was also the case in a Berkshire wood, where during twenty years I have only seen a solitary flowering specimen, notwithstanding the presence of hundreds of plants, some of them being also apparent seedlings. The plant evidently requires a certain amount of sunshine, because the flowering plants have been found almost invariably in a clearing, or by, and even on, a woodland path. Syme (Eng. Bot. ed. 3, ix. 193) accurately points out that the bulb is "solitary, enclosed in the yellowish coats," with "a number of bulbules about the size of sago grains at the base." The perennation, therefore, takes place in a rather curious manner. The parent bulb has a number of bulbules, ten to twenty, at the base; as the old bulb dies, the young ones grow, and, separating from the parent, send

out next year a solitary radical leaf. These tufts of young plants, growing in a small, more or less regular, circle, therefore have the appearance of seedlings; but such is not the case. These first-year plants give again rise to two to five bulbules, and so the plant is propagated without flowering and fruiting. I have not yet been able to see a ripe fruit; but who would say the plant is not indigenous? Like other plants whose nativity has been questioned from this reason, it has found other ways of perpetuating the race.
G. C. DRUCE.

PLANTAGO LANCEOLATA VAR. SPHÆROSTACHYA RÖHL.—I gathered the above (p. 126) at Holburn Head, Caithness, in 1902, and recorded it in the *Annals of Scottish Natural History* for 1904, p. 172, as *P. lanceolata* var. *capiteliata* [Sond. ex] Koch. I have the same plant from Tain sand-dunes in East Ross and from Berry Head, Devon; and have seen it on Aberfraw Common, Anglesey, &c.
G. C. DRUCE.

THE NAME OF THE PRIMROSE.—At the meeting of the Linnean Society on the 21st December last, Dr. Rendle, in giving a summary of the work of the International Botanical Congress held at Vienna in June last, mentioned, in connection with the new rules of nomenclature, that "*Primula veris*, L. var. *acaulis*, L. (1753), is written *P. vulgaris*, Huds. (1762), since the latter combination is earlier than *Primula acaulis*, Jacq." As we have used the name of *P. acaulis*, L. in the ninth edition of Babington's *Manual*, we think it well to point out that Linnæus, in the "*Flora Anglica*," 1754 (p. 12), which forms part of the *Dissertationes Academicæ*, published the name as *P. acaulis*, with a reference to Ray's *Synopsis* (ed. iii.) which is sufficient to identify the plant intended, so that we think *P. acaulis* L. should stand. Mr. Jackson, who kindly helped us to run down the original reference, tells us that the "*Flora Anglica*" is properly ascribed to Linnæus, although the name of his pupil, I. O. Grufberg, appears on the title-page.—H. & J. GROVES.

NOTICES OF BOOKS.

Die Algen der ersten Regnellischen Expedition. O. F. BORGE.
Stockholm, 1903.

THIS is a very important addition to our knowledge of the Desmids of Brazil and Paraguay, a region which has previously proved to be a rich one in well-marked species. About ten previous papers have appeared on Algæ from this district. There are sixty-seven pages of text and five double plates (practically ten plates), containing one hundred and forty-eight excellent figures. The material was collected by Dr. Malme, and consisted of twenty-six gatherings from Rio Grande do Sul, eighteen from Matto Grosso, and nine from Paraguay. A large number of species and varieties occurred in the collections; among them twenty-nine new species

are described and thirty new varieties, in addition to which many new forms are figured and described. Many known species are also illustrated to show the forms that were met with in this region. Some of the new species are very characteristic, such as *Cosmarium splendidum*, *C. simulum*, *Xanthidium ornatum*, *X. paraguayense*, *Staurastrum nudibrachiatum*, and *Micrasterias oruamentalis*. The new species, varieties, and forms are very clearly described.

WM. WEST.

Sur la Transmissibilité des Caractères acquis; Hypothèse d'une Centro-épigénèse. EUGENIO RIGNANO. Paris: Felix Alcan. 1906. 5 francs.

THIS book is one of the numerous works that have been called forth by the various theories which, during the past twenty years, have been given to the scientific world by Weismann. Under his direction the old battle-field of preformation or epigenesis has been once more occupied, and is at this moment the scene of much dialectical carnage, his great opponent being another equally distinguished man of science, Professor Hertwig. The writer of the work under review—oddly enough an engineer, and not a biological professor—possesses an extraordinary knowledge of the literature of his subject; and of the vast amount of reading which that indicates, no one but a constant student of biological journals and other publications of a like kind can form the remotest conception. Hence, whether one agrees with his thesis or not, M. Rignano's work can be heartily commended as a storehouse of quotations from the most eminent writers on this highly controversial question, and as a *vade-mecum* of useful references. The author sees the difficulties which attach to both epigenetic and preformistic explanations of development, and he attempts to formulate an intermediate theory by which the facts of development are explained by the action of the germinal substance, which, though separated from the remainder of the body and limited to a single zone, exercises upon the whole organism, during its development, a formative action of an epigenetic character, without in any way becoming altered itself as a result of its action. It is obviously impossible, within the limits of this notice, to attempt any criticism of this thesis; but this may be said, that the question is a part of that greater question of vitalism which is now receiving so much attention at the hands of philosophers and of biologists, and that the book under review is one which cannot be neglected by any person paying attention to such matters. Hence we commend it to those catholic philosophers who are engaged in making a serious study of the biological problems of the day. A serious study, we say advisedly, for the book is by no manner of means of a popular character, but rather as close a piece of reasoning as one can expect to come across.

B. C. A. WINDLE.

BOOK-NOTES, NEWS, &c.

At the meeting of the Linnean Society on 5th April, Mr. Clement Reid exhibited nearly fifty photographs of plants new to the Preglacial Flora of Great Britain. He explained that these were derived from material procured at Pakefield, near Lowestoft, and had occasioned many months' continuous labour on the part of Mrs. Reid and himself. On a former occasion (21st April, 1904) he had shown a series of drawings from the fruits obtained by breaking up the matrix, and selecting the liberated specimens; but this process was tedious and unsatisfactory, and he had resorted to photography. The remains were black, and therefore troublesome to photograph, but the specimens themselves could not long be preserved, as an efflorescence occurred, and they fell to pieces; but experiments were now being conducted with a view of permeating the fruits with paraffin, and so ensuring their preservation. Mr. Spencer Moore contributed a paper on some African *Rubiaceæ* and *Compositæ*, based on the plants in the National Herbarium. Besides describing new species, Mr. Moore gives notes on other points of interest, notably upon three little-known *Compositæ*. *Bembicodium Athanasia* Kunze, a plant formerly cultivated in the Leipzig Gardens, of which the type is in the British Museum, proves to be identical with *Athanasia oligocephala* DC.; *Sphenogyne brachyloba* Kunze, overlooked by Harvey in the *Flora Capensis*, like the last was obtained from the Auerswald Herbarium; *Dicoma radiata* Less., not seen by the late Mr. Bentham when working on the *Compositæ* for the *Genera Plantarum*, was collected by Francis Masson in the eighteenth century.

At the same meeting Mr. E. J. Schwartz read a paper on the structure of the stem and leaf of *Nuytsia floribunda* R. Br., which was illustrated by lantern-slides. The leaves are linear-acute, of length about one inch, and the stomata, which are in more or less regular rows, are transverse to the leaf-axis. In section the leaves show a meristele of three bundles embedded in a water-storing tissue, which is in turn surrounded by the assimilatory tissue; one or more resin-sacs are to be found above the bundles. The stem has many points of interest—a heterogeneous strongly thickened and pitted pith containing a central resin-canal proper to the stem itself, accompanied by three or more perimedullary canals; islands of phloem and cambium embedded in secondary xylem; and a cork of epidermal origin, all points of difference from the other members of the *Loranthaceæ*. The assimilatory tissue throughout the plant is rich in tannin, and no calcium-oxalate crystals are to be found in the stem. Another paper was by Mr. B. Hayata, on *Taiwanites*, a new genus of *Coniferae* from the Island of Formosa. Dr. Masters considers the genus a valid one, judging from a small scrap which he had received from the author, who believed his new genus to be intermediate between *Cryptomeria* and *Cunninghamia*; he himself pointed out that it combined the foliage of *Athrotaxis* with the cone of *Tsuga*; in any case it is a most interesting genus.

It is an immense gain to the student when some vigorous worker, who knows how to attack a problem and solve it, sets himself to clear up the puzzles and obscurities of his subject. There are many such obscurities in Fungology, and Mr. G. J. Atkinson has rendered this service in demonstrating the true life-history of *Hypocrea alutacea*. In this genus of Pyrenomycetes the usual mode of growth is a flat or cushion-like stroma, in which the perithecia are embedded. In the case of the upright-stalked species, *H. alutacea*, it was taken for granted that the main body of the plant belonged to some other fungus, *Clavaria* or *Spathularia*, on which the *Hypocrea* seemingly spread a parasitic stroma. The absence of any form of *Clavaria* or *Spathularia* from the neighbourhood was overlooked, or it was assumed that all such fungi within reach had been monopolized by the *Hypocrea*. Cornu first suspected that the fungus was autonomous, and, later, Schroeter took the same view. Mr. Atkinson has supplied the proof hitherto wanting, by growing the fungus, an upright-stalked stroma, from spore to fruit on artificial media. He revives for it an old generic name, and it now stands *Podostroma alutacea*. The paper originally appeared in the *Botanical Gazette* for December, 1905. In another paper, reprinted from the *Journal of Mycology* for the same year, Mr. Atkinson traces the history and development of the two parasitic genera *Balansia* and *Dothichloe*; both form stromata with perithecia on grasses or sedges. He discusses the economic importance of these fungi, which have done little harm so far, but are capable of changing their hosts, and of causing great injury to forage grasses.

JOHANN & ERNEST FELTGEN have issued a preliminary study of a projected Fungus-Flora of the Duchy of Luxembourg, in which is presented a long and jumbled list of species that follow each other without any apparent order. Many new species are described, and some descriptions are given without any specific name attached. In one case the record is "? Myxomycet," with a diagnosis appended; in another, "Hyphomycet," with only the habitat given. Doubtless the complete work will fill up the blanks, and give us a system easier to follow; but the present instalment is by no means a satisfactory production.

THE last number of *Flora and Sylva*, which completed its third volume and its serial existence in December last, contains a memoir by the editor, Mr. William Robinson, of HENRY GEORGE MOON, the artist to whose beautiful work the publication owed much of its attractiveness. He was born at Barnet, Feb. 10, 1857, and became a clerk to a solicitor; fortunately, however, he made acquaintance with Mr. Robinson, who employed him on the *Garden*, thereby enabling him to enter upon the art career he had always wished to follow. Mr. Robinson gives an interesting account of Moon's methods, and of the scope of his work, which included landscapes in oil: "I often thought," he says, "that if less of his work had been given to plant-drawing, how much better it would have been for landscape art." Moon died at St. Albans on Oct. 6; the notice is accom-

panied by an excellent portrait. *Flora and Sylva*, the handsomest of our gardening periodicals, will henceforth be issued in yearly volumes.

FASCICLES vii. and viii. of Herr C. Christensen's *Index Filicum* (Copenhagen: Hagerup, 1906, pp. 385-512) were published in February and April respectively, and advance the alphabetical enumeration of species and synonyms from *Leptochilus decurrens* to *Polypodium Baccarianum*. We must call the author's attention to an omission on p. 496. He refers *Platycerium biforme* Bl. as a synonym to *P. coronarium*, but omits the latter species altogether.

In last year's *Journal* (p. 163) we favourably reviewed Prof. de Vries's series of American lectures, issued in book-form under the title of *Species and Varieties: their Origin by Mutation*. It is not surprising that within the space of fourteen months another edition has been called for. Beyond including a portrait of the author *en déshabille*, and a note on *Onothera* on p. 575, the present issue is practically a reprint, with correction of a few typographical errors. The brilliant Dutch botanist is to be congratulated on the reception which has been accorded to his work in scientific circles, both in Europe and North America.

THE publication of the *Kew Bulletin* proceeds apace. "No. 1," for 1902, price 2d., appeared about the end of March; this is the volume for the year, occupying twenty-six pages (with index and title). It contains one of the late Director's prefaces, without which no number seems complete; and such useful information as the number of visitors to the Gardens in 1901, and certain appointments made in 1902. There are interesting articles on the forms of Ginseng by Mr. I. H. Burkill, and on Khasia Patchouli by Dr. Prain; the latter is headed and indexed as "with plate," but an inserted note in the copy before us states that "The Bentham Trustees obligingly supplied, free of cost, a limited number of copies of the plate. This is now exhausted." Surely the authorities might have afforded to print more "copies," rather than send out an incomplete work? The volumes for 1903 and 1904 each consist of a "No. 1," the former costing 3d. and the latter 2d.; each contains a considerable amount of out-of-date information, most of it, it would seem, of little or no possible use. "No. 3" for 1905 concludes that volume, so that the bibliography of this eccentric journal, which we hope to publish, can be completed up to the end of last year. This contains a paper on *Kickxia* and *Funtumia*, by Dr. Stapf, which is of considerable botanical interest, and one of the late Director's prefaces. It also indicates that the "dormant vitality" of the *Bulletin* was due to the inability of the Director, on account of "the continual encroachment of administrative and official work, to give the necessary time to its preparation"; and (incidentally) implies that no one else could be found capable of undertaking the task. "It is now proposed to issue the available matter on hand in one or more numbers for each year," and it is a tribute to the energy of the new Director that two numbers for 1906 have already appeared. The first of these we noticed on page 137;

the second, issued in April, contains two papers by Mr. Massee, each accompanied with a plate—a revision of *Hemileia*, and descriptions of three new Fungi found in the Gardens. There is the usual preface by the late Director—this time it is that to the *Fauna and Flora of Kew Gardens*, recently issued as “Additional Series V.” of the *Bulletin*, which we hope to notice later.

WE note that Mr. Thomas Jamieson’s treatise on the *Utilisation of Nitrogen in Air by Plants*, to which we referred on p. 143, is meeting with justly severe criticism elsewhere. A long letter exposing its manifold inaccuracies appeared in the *Scotsman* of March 23, from the pen of Mr. George West, from which we learn that the work has also received “masterly criticism” from Prof. Balfour.

THE National Herbarium has lately acquired the collections and drawings of fungi of the late William Phillips of Shrewsbury. The collections contain numerous types of British Discomycetes and the Californian types of Phillips and Harkness, together with those of Phillips and Plowright and of Cooke and Phillips. The drawings, over three thousand in number, are a very valuable addition to the unique collection of figures of fungi possessed by the National Herbarium.

A USEFUL addition to the books that treat of our native Hepaticæ is Mr. Symers M. Macvicar’s *Revised Key to Hepatics of the British Islands* (Eastbourne: V. T. Sumfield, Station Street; 1906, 19 pp., price 9d., post free). For the benefit of beginners this key is planned largely on superficial characters. For instance, a fundamental factor in the grouping of the genera is found in the under leaves, namely, in their presence or absence and their relative sizes as compared with the leaves. Characters drawn from the leaf-cells are rarely employed, as they prove too difficult for the beginner. Sound advice is given in the preface as to how specimens ought to be examined, and as to the importance of determining the position and character of the perianth and the nature of the inflorescence. Keys to the species are supplied under the genera. In its original form Mr. Macvicar’s Key was printed in this Journal (1901, pp. 154–167), a fact to which no reference is made in the new edition.

THAT great in every sense undertaking, the *Flora Brasiliensis*, has been brought to a conclusion by the issue of Fascicle cxxx.; this oddly enough but not inaccurately concludes “vol. i. pars i.” of the work, which was begun in 1840. It consists mainly of biographies (in Latin) of the contributors to the *Flora* and of the travellers upon whose collections it is largely based; this is by Dr. Urban, who has already shown special aptitude for this kind of work, and is excellently done.

WE regret that certain errors of transcription, mostly of very slight importance, were overlooked in correcting the proofs of the portion of the “Index Abecedarius” which formed the Supplement to our last number. These have been corrected for the reprint which will be issued when the Index is complete. The intention is to give each name as it stands in the *Species Plantarum*.

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Bibliographical matters have also received and continue to receive considerable attention, and the history of many obscure publications has been elucidated. Every number contains reviews of new and important books written by competent critics: in this as in every other respect a strictly independent attitude has been maintained. While in no way officially connected with the Department of Botany of the British Museum, the Journal has from the first been controlled by those whose acquaintance with the National Herbarium has enabled them to utilize its pages for recording facts of interest and importance regarding the priceless botanical collections which the Museum contains. In 1896 it became necessary to increase the size of the Journal, owing to the number of papers sent for publication: the number of plates was at the same time augmented.

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A. Varieties of *Helosciadium nodiflorum* Koch.
 B. Leaf structure of *Widarringtonia* Wight & A. R. S. R. S. R. S.

BRITISH FORMS OF HELOSCIADIUM NODIFLORUM KOCH.

BY REV. H. J. RIDDELSDELL, M.A., & EDMUND G. BAKER, F.L.S.

(PLATE 479A.)

THE following notes will, it is hoped, serve to clear up the uncertainty as to the characters which separate the varieties of *Helosciadium nodiflorum* Koch occurring in this country. We have endeavoured to study authentic material, and have embodied in the following diagnoses what we consider the leading differential characters. In doing so, we have become convinced that there is an almost unbroken series of forms, ranging from the ordinary ditch plant (var. *vulgare* Schultz) on the one hand, to the much rarer true *H. repens* Koch on the other. A good illustration of this occurs on a sheet of specimens gathered by Mr. Druce at Binsey, Oxfordshire, and kindly submitted with other material to one of us.

As to the effect of the immediate environment in producing these forms, we have not at present sufficient data to form a conclusive opinion; but the evidence that we have leaves little doubt that there is an intimate connection between the two. The forms here described must be regarded rather as links in a chain than as covering the whole series of obtainable specimens.

In this country much confusion was originally caused by the publication of t. 1431 (and accompanying description) of the first edition of *English Botany* as *Sium repens*. The plant there figured was named *pseudo-repens* by H. C. Watson in *London Catalogue*, ed. vi. (1867),* who recognized that it differed from the *Sium repens* of Jacquin.

Again, Babington, up to the eighth edition of his *Manual*, used the name *repens* for what is apparently partly *pseudo-repens* of Watson, and partly *H. repens* Koch; but in the eighth edition he diagnosed the true *repens* correctly, and used the name *ocreatum* for the plant figured in t. 1431 of E. B. His herbarium shows that he supposed the latter to be the same as var. *ochreatum* of DC. Prod. iv. p. 104 (1830), but subsequent investigation proves it to be quite distinct.

The chief points to note for the discrimination of the various forms are:—

(a.) Whether the main stem roots at the base only, or also at the upper nodes.

(b.) The character of the outline, serration, and number of the leaflets.

(c.) The length of the peduncle.

(d.) The nature of the involucre when present, and whether the bracts are 1-2 and unilateral, or more numerous and encircling the apex of the peduncle.

* As var. of *Helosciadium nodiflorum*; cf. Watson, *Comp. Cyb. Brit.* 519 (1869).

(e.) Fruit characters; an important help in distinguishing true *nodiflorum* from true *repens*. Further knowledge and observation of fruit characters are much to be desired.

(f.) The size and habit of the whole plant.

Of the literature of the subject, the following is the most worthy of attention:—Jacquin (*Fl. Austr.* t. 260, 1775) gives a good description and figure of the true *repens*. De Candolle (*Fl. Fr.* iv. 300, 1815) noted var. *ochreatum* as a variety of *Sium repens* intermediate between this and *nodiflorum*. In the *Prodromus* (iv. 104, 1830) he transferred the variety to *Helosciadium nodiflorum*, the genus *Helosciadium* having been founded by Koch in 1824 (*Nov. Act. Nat. Cur.* xii. 1, 126). F. Schultz in *Bonplandia* (ii. 237, 1854) systematized the forms, and diagnosed the varieties *vulgare*, *depressum*, and *longipedunculatum*. We must also mention the figures of Reichenbach (*Icones Fl. Germanicæ*, xxi. MDCCCLV. and MDCCCLVI. ("MDCCCXLVI."), and the admirable descriptions of Grenier and Godron (*Fl. de France*, i. 735). The descriptions of the varieties in Rouy & Foucaud's *Fl. de France* (vii. 363) do not serve to clear up the difficulties.

We have consulted the material in the National Herbarium, which contains the specimen from which t. 1431 of *English Botany* was drawn, and also specimens of var. *longipedunculatum* from the type locality. We are indebted to M. Casimir De Candolle for sending us a photograph of the type of var. *ochreatum* DC. preserved in the Candollean Herbarium at Geneva; this is partly reproduced in the accompanying plate.

We have drawn up the following clavis indicating some of the main points of distinction; this is followed by diagnoses of those forms which appear to us worthy of description, and which we recognize as occurring in Britain:—

- A. Involucre 0 or 1 or 2 bracts, in var. *longipedunculatum* Schultz sometimes 3.
 - a. Peduncle 0 or short. Plant rooting at base only, stout. Leaflets 3–7, elliptical-lanceolate or ovate lanceolate Var. *vulgare* Schultz.
 - β. Peduncle always present, sometimes attaining the length of the rays.
 - * Roots at most of the nodes. Leaflets 5–7, sublanceolate Var. *ochreatum* DC.
 - ** Small plant, rooting at all the nodes. Leaflets generally 3–5, broadly ovate or rotund Var. *pseudo-repens* H. C. Watson.
 - γ. Peduncle long. Stem slender, elongate. Leaflets 5–7 Var. *longipedunculatum* Schultz.
- B. Involucre of 3–7 bracts. Leaflets 9–11. Peduncle long Var. *repens* (Koch).

HELOSCIADIUM NODIFLORUM Koch, *l. c.* 126; Syme, *English Botany*, ed. iii. iv. 100.

Sium nodiflorum L. *Sp. Pl.* 251 (1753), and *Herb.*!

Apium nodiflorum Reichb. fil. *Ic. Flor. Germ. et Helv.* xxi. 10, t. 1856 (1846).

Var. *VULGARE* F. Schultz in Bonplandia, ii. 237 (1854); Woodville, Med. Bot. t. 182 (1793); Smith, English Botany, t. 639 (coloured portion). Plant varying in size from 1·5 dm. to a metre. Principal stem *rooting only at the base*, generally robust, decumbent or ascending. Leaves springing at an acute angle from the stem, pinnate, length varying with size of plant, but generally much larger than in var. *pseudo-repens* or subsp. *repens*. Ocrea at base partly clasping stem, as in other varieties. Leaflets 3–7, in very stout plants as many as 9–11, *elliptic lanceolate or ovate lanceolate*, normally not lobed except sometimes 3-lobed terminal leaflet. Leaflets varying usually from 2–4 cm. in length according to size of plant. Peduncle of fully developed plant *shorter than rays*, sometimes almost absent. Rays of umbel 4–10. *Involucre bracts 0 or 1 or 2*, “caducous,” but fruiting umbels in Herb. Mus. Brit. show involucre bracts still persisting. Fruit generally slightly *longer than broad*. Primary ridges much more prominent than secondary.

This is the well-known common ditch form, and is so widely spread that it seems unnecessary to give a detailed list of localities. It occurs freely in England and Wales; we have not seen much material from Scotland and Ireland.

Var. *OCHREATUM* DC. Prod. iv. 104 (1830) = *Sium repens* β *ochreatum* DC. Fl. Fr. iv. 300 (1815). *H. nodiflorum* Koch β *depressum* F. Schultz, l. c. 237. Plant with the habit of var. *vulgare*, in size about half-way between *vulgare* and *pseudo-repens*, apparently prostrate, and *rooting at many of the nodes*; “sub-creeping” (DC.). Leaves smaller than in var. *vulgare*, and coming off the stem at about the same angle. Petiole membranous, dilated at base, but only slightly more so than in the other forms. Leaflets 5–7, *sublanceolate*, terminal longer than broad, either entire or trilobed. Peduncle of fully developed plant always present, *generally shorter than rays of umbel*. Rays 5–6. *Involucre bracts 0, or 1–2*.

This variety is intermediate between *vulgare* and *pseudo-repens*, but in our opinion is very close to the former. It mainly differs in being smaller in all its parts, having longer peduncles and more creeping stems. We should not, if dealing with the matter in the first instance, have considered it worthy of a separate name.

From Barnes Common, Surrey, coll. Geo. Nicholson, Herb. Mus. Brit. Marl-pit, Huddlesford, near Lichfield, coll. Dr. Power, 1832, hb. Holmesdale N. H. Club.

A plant from Chalvey, Bucks, coll. G. C. Druce, is not quite typical.

A specimen from Haxey, N. Lincs., 1881, coll. Geo. Webster (see Bot. Exch. Club Rep. for 1881, p. 51), and labelled “*Helosciadium ochreatum* DC., fide J. T. Boswell” (in Herb. Mus. Brit.), is *H. inundatum* Reichb. fil.

Var. *PSEUDO-REPENS* H. C. Watson, Lond. Cat. ed. vi. 10 (1867) (nomen); Comp. Cyb. Brit. 519 (1869).

Sium repens Sm. English Botany, t. 1431.

Helosciadium nodiflorum Koch var. *ochreatum* Babington, Manual, ed. viii. 157; ed. ix. 168.

H. nodiflorum var. *repens* Syme, E. B. ed. 3, t. 574.

A small plant, slender, *rooting at most of the nodes*. In the type the branches are only some 5 cm. long. Leaves small, spreading at various angles from the stem. Petiole generally longer than the rachis (longer than in E. B. 1431). Leaflets of type small, generally 3, *broadly ovate or subrotund*, terminal broader than long, often $\pm$ trilobed, bluntly toothed. Peduncle in fully-developed plant always present, *usually shorter than rays of the umbel*; much shorter than in true *H. repens* Koch. Rays of umbel 3-5. *Involucre bracts 0, or 1-2*. "Anthers yellow," E. B. 1431. Fruit not seen, but described in E. B. 1431 as small, roundish.

This plant grows in moist boggy meadows, but not in ditches. The specimen figured in *English Botany* was sent from near Edinburgh by Mackay.

Babington's herbarium at Cambridge contains a sheet of plants from two localities—Caernarvon and Mullet, Co. Mayo—which are labelled by him var. *ochreatum* DC. These plants seem to agree well with the plants from which E. B. t. 1431 was figured—*i. e.*, var. *pseudo-repens* Wats., and with the description of the variety in Bab. Man., which was first called *repens* and afterwards *ocreatum*. We therefore consider that var. *ocreatum* of Bab. Man. ed. viii. and ix. is simply a synonym of var. *pseudo-repens* Wats., as stated above.

In addition to the above we have seen satisfactory specimens of var. *pseudo-repens* from v.-c. 21. Tothill Fields, Middlesex, ex herb. Ed. Forster, labelled "*S. repens* Jacq." 29. Cambridge, ex herb. A. Fryer, 1883. 41. Clyne Common, Glamorganshire, coll. D. Fry, 1887, labelled var. *ochreatum* DC. 49. Portmadoc, coll. A. Ley, 1886. All in Herb. Mus. Brit.

Var. *LONGIPEDUNCULATUM* F. Schultz, *l. c.* 237.

H. repens Syme ex Schultz, *l. c.*, non Koch.

Stem very long, slender, *rooting at lower nodes*, internodes long or very long. Leaves with long petioles, not nearly so erect as in var. *vulgare*. Leaflets generally 5-7, *ovate or broadly ovate*, coarsely serrate occasionally with small lobes. Peduncle long, *generally longer than the rays of the umbel*. Rays of umbel 4-7. *Involucre always present, 1-3 bracts*. Ripe fruit not seen.

Specimens from the following localities are in the National Herbarium:—Duddington Loch, Edinburgh, *J. T. Syme*; *C. Bailey*, 1882. Guillon Links, East Lothian, *J. R. Scott* and *W. Jameson*, 1819 (Herb. Edinense, No. 16); *G. Don* (Herb. Mus. Brit.), No. 30.

The plant recorded in the *Flora of Herts* (p. 192) from London Colney as this variety approaches it in some respects, but can hardly be admitted as identical.

Other plants near var. *longipedunculatum* have been seen from North Berwick Links, Haddington, coll. *W. H. Campbell*, in herb. Watson; from Foxhall, Northamptonshire, herb. *G. C. Druce*; and from quarry near Upware, Cambs, in herb. Babington. Cultivated specimens of true *repens*, as *e. g.*, the Portmeadow plant, which was cultivated by Mr. Druce, bear a strong resemblance to var. *longipedunculatum*.

Var. *REPENS* Koch, Umbelliferæ, 126 (pro specie); Grenier &

Godron, Fl. de France, i. 736; F. A. Lees in Bot. Exch. Club Report for 1879, 13.

Sium repens Jacq. Fl. Austr. iii. 34, t. 260 (1775); Linn. fil. Suppl. 181 (1781).

Apium repens Reichb. Icones Fl. Germ. xxx. t. MDCCCLV. iii. 7-12.

Plant small, slender. Stem prostrate, *rooting at every node*. Leaves springing erect or suberect from all the nodes, pinnate, total length 4-6, rarely 9 cm., forming about a right angle with the stem; membranous dilatation at base of petioles present but short. Leaflets 9-11, *subrotund-orate in outline*, unequally dentate serrate, upper and middle leaflets sometimes *lobed as far as the middle of the leaflets or slightly below*, making a sub-bifid leaflet. Peduncle of fully-developed plant generally 3-4, rarely 7 cm. long, *2-3 times longer than the rays of the umbel*. Rays of umbel generally 5-6. *Involucre of 3-7 bracts, "persistent."* Inflorescence and leaves often approximately of the same length. *Fruit broader than long*, smaller and shorter than in var. *vulgare*. Primary ridges *very little more prominent than secondary*.

We have only seen true *H. repens* Koch from Hughenden, Bucks, *E. Chandler* (Herb. Mus. Brit.), and Binsey, Oxon (herb. G. C. Druce; one of a series of intermediate forms between *repens* and *nodiflorum*). Cowley Bottom, Oxon, *Sibthorp* (Herb. Mus. Brit.). Port Meadow, Oxon, 1893 (herb. G. C. Druce). Skipwith Common, Yorks, S.E., *F. A. Lees* (Herb. Mus. Brit.). Mr. H. C. Watson in the *Botanical Record Club Report* for 1875 is quoted as stating that a plant submitted to him from this locality by Messrs. F. A. Lees and H. F. Parsons was the best example he had seen of *H. repens*. Guillon Links, East Lothian, coll. Mackay, 1795 (*herb. Smith*).

Doubtful plants coming very near the true *H. repens* we have seen from Bungay Common, Suffolk, coll. Stock, *herb. Hooker at Kew*; Sturbridge Fair Green, Cambs, coll. S. W. Wanton, *herb. Babington*.

As confusion occasionally occurs between *H. nodiflorum* Koch and *H. repens* Koch on the one hand, and *H. inundatum* Koch and its South European ally *H. crassipes* Koch (Reichb. Ic. Fl. Germ. xxi. t. MDCCCLIV. i. 1-3) on the other, we think it may be worth while to give the following clavis:—

* Leaves all aerial. Umbels with 3-12 rays.

H. nodiflorum Koch and *H. repens* Koch.

** Leaves submerged and aerial. Submerged leaves divided into capillary segments, aerial pinnatisect. Umbel with 2-5 rays.

α. Umbel with 2 rarely 3 rays. Styles very short, shorter than the stylopodium. Fruiting pedicels not thickened. Fruit oblong, 2-4 mm. long *H. inundatum* Koch.

β. Umbel with 3-5 rays. Styles longer than the stylopodium. Fruiting pedicels thickened. Fruit small, broadly ovoid, 1.0-1.50 mm. long *H. crassipes* Koch.

DESCRIPTION OF PLATE 479 A. — Fig. 1. *Helosciadium nodiflorum* Koch var. *ochreatum* DC. from photograph of type in De Candolle Herbarium. 2. *H. nodiflorum* Koch var. *repens* (= *H. repens* Koch) from a specimen from Potsdam in the National Herbarium. 3. Fruit of *H. nodiflorum* Koch (enlarged). 4. Fruit of var. *repens* (enlarged).

WIDDRINGTONIA IN SOUTH TROPICAL AFRICA.

BY A. B. RENDLE, M.A., D.Sc.

(PLATE 479 B.)

DR. P. L. SCLATER recently presented to the Department of Botany some fine specimens from a species of *Widdringtonia* growing on the late Mr. Rhodes's farm at Inyanga, near Umtali, Rhodesia. The specimens showed the spreading *Retinospora* type of foliage, as well as the appressed cupressiform type, and also bore clusters of ripe cones. The presumption was that the species represented *W. Mahoni*, described by Dr. Masters in his recent monograph of the genus (Journ. Linn. Soc. xxxvii. 271) from specimens brought from Melsetter, in South-east Rhodesia, about one hundred miles south of Umtali. More recently Mr. Arthur Sclater has sent foliage from Melsetter which is identical with that of the Umtali specimens.

The material sent by Mr. Mahon was scanty, consisting of fragments of foliage-shoots and a cluster of unopened cones. Mr. Mahon notes that "the timber is firm and odoriferous, resembling that of *W. Whytei*, as do the fruits and seeds, but the foliage is distinct, and markedly so in the young state, when the plants are of a dull dark green, without the bluish green hue so remarkable in young specimens of the Milangi cedar." Examination of the ample material sent by Dr. Sclater and his son, and comparison with the fine series of specimens of *W. Whytei*, from Nyassaland, at Kew and the British Museum, lead me to conclude that we are dealing with a single species, occurring in South-east Rhodesia as well as in Nyassaland; (Umtali is only about three hundred miles to the south-west of Mt. Milangi). I can find no distinguishing features in the foliage from the Rhodesian or the Nyassaland specimens. There is some variation in the diameter of the ultimate branchlets, and transitional stages are found between the spreading juvenile or *Retinospora* type of foliage and the cupressiform type which alone occurs on fertile branches. In one case a curious *Equisetum*-like form was shown. The arrangement of the leaves suggests a derivation from the tetrastichous type, so characteristic of the *Cupressineæ*, and is aptly described by Dr. Masters as "laxiuscule subspiraliter vel subtetrasticha."

Details of leaf-anatomy are often helpful in distinguishing species among conifers, especially the number and position of the resin-canals. The internal leaf-structure does not in this case afford distinctive characters. Generally there is a prominent resin-canal in the middle line of the leaf immediately above the vascular bundle;

the diameter of the canal varies in different leaves, and in different parts of the same leaf; in the broader parts of the leaf two smaller canals are often present, one on each side of the median. Below the epidermis, especially in the middle line of the leaf, is a band of mechanical tissue, and transfusion tracheids are more or less plentiful to the right and left of the vascular bundle. A similar arrangement of parts occurs in the South African *W. cupressoides*, and also in *W. juniperoides*, from the Cedarberg Mountains. In my original description of *W. Whytei* (Trans. Linn. Soc. ser. 2, iv. p. 61, t. ix. figs. 7 & 8) I contrasted the leaf-anatomy of *W. juniperoides* and *W. Whytei* from this point of view; examination of a larger series of specimens shows that in *W. juniperoides* two lateral canals are sometimes present.

There is some variation in the size of the cones, but this variation is shown in specimens from Mt. Milangi, which are admittedly conspecific. Thus the specimens from Umtali bear smaller cones closely resembling those on a specimen from Milangi at Kew, collected by Mr. D. B. Ritcher; this Milangi specimen also bears larger more robust cones, similar to those of the original Milangi specimens from Mr. Whyte. The cones of the Rhodesian specimens, so far as I have seen, never reach the size or robustness of the larger Milangi specimens. The cone-scales have a similar texture in all the specimens, showing a rough somewhat tubercled dorsal surface, different both from the extremely tubercled scales of *W. juniperoides* and the smooth-backed scales of *W. cupressoides*. The cones of the two South African species are also considerably larger and the scales stouter than in the tropical species.

The seeds are identical in all the tropical specimens. As regards the difference in colour of the foliage noted by Mr. Mahon, it is impossible to judge from herbarium specimens, in which no such difference is apparent. It seems, however, insufficient to justify a specific separation, and the evidence points to the existence of one species, namely, *Widdringtonia Whytei*, common to this area of South-east Tropical Africa.

Dr. Sclater is informed that local tradition ascribes the introduction of the Umtali specimens to the Queen of Sheba. They are known locally as cedars, and were presumably the descendants of plants grown from seeds brought back by the Queen from her visit to King Solomon.

In the preparation of the leaf-sections, a large series of which has been examined, I have to acknowledge the help of Mr. W. Williams, Demonstrator in Botany at the Birkbeck College.

EXPLANATION OF PLATE 479 B.

Transverse sections of leaves of *Widdringtonia Whytei*, from Umtali, Rhodesia, $\times 90$.

1. Showing median and lateral resin-canals. 2. Showing single median resin-canal. *m*, thick-walled mechanical tissue; *r*, resin-canal; *tr*, transfusion tissue; *v. b.* vascular bundle.

A REVISION OF ACRIDOCARPUS.

BY T. A. SPRAGUE, B.Sc. (Edin.), F.L.S.

THE present paper is the outcome of a rearrangement of the Kew material of *Acridocarpus*, during which it became evident that a revision of the genus was needed. Before dealing with questions of a more or less controversial nature, it may be well to give a summary of previous work on the genus.

HISTORY OF THE GENUS.

1790. Cavanilles (Diss. Monadelph. ix. 424, t. 247) described and figured, under the name *Banisteria Leona*, Sierra Leone specimens in Thouin's herbarium, which he stated were given to Thouin by Smeathman.

1818. Robert Brown (in Tuckey's *Narrative*, 425) stated that there were three *Malpighiaceæ* in Christian Smith's Congo collection. "One of these is *Banisteria Leona*, first described, from Smeathman's specimens, by Cavanilles, who has added the fruit of a very different plant to his figure. . . . The two remaining plants of *Malpighiaceæ*, in the collection, with some additional species from different parts of the coast, form a new genus, having the fruit of *Banisteria*, but . . . remarkable in having alternate leaves." [The two plants are *Acridocarpus longifolius* and *A. congolensis*.]

1824. Augustin Pyramus De Candolle (Prodr. i. 592) described, under the name *Heteropteris* ? *Smeathmanni*, a fruiting specimen collected in Sierra Leone. To receive this he created a new section of *Heteropteris*, which he named *Anomalopteris*, and characterized by the possession of *alternate* leaves.

1827. Schumacher and Thonning (Guineiske Plant. 222) described, under the name *Malpighia alternifolia*, material collected by Thonning on the Gold Coast.

1830. J. C. Loudon (Hort. Brit. 182) published *Banisteria zanzibarica* Bojer, which, he stated, was introduced into England from Zanzibar in 1825.

1831.* Guillemin and Perrottet (Fl. Senegamb. Tent. 123, t. 29) established the genus *Acridocarpus*, which they distinguished from *Banisteria* by the following characters:—Leaves alternate; only one of the sepals glandular on the back; filaments scarcely coherent at the base; ovary crowned with two very long incurved styles, which are not broadened at the apex. They described a new species, *A. plagiopterus*, collected by Leprieur at Casamancia in Senegambia, and transferred *Heteropteris* ? *Smeathmanni* DC. to *Acridocarpus*, giving it the name *A. Smeathmanni*. To *A. Smeathmanni* they referred a specimen in Jussieu's herbarium, named *Banisteria Leona* by Cavanilles. They also reduced, doubtfully, to *A. Smeathmanni*, *Malpighia alternifolia* Schum. et Thonn.

* *Acridocarpus* Guill. et Perr., and *Anomalopteris* G. Don, were both published in the latter part of 1831; I have not succeeded in ascertaining which appeared first.—T. A. S.

1831. George Don (Gen. Syst. i. 634, 647) raised De Candolle's section *Anomalopteris* to generic rank, and gave short diagnoses of three species. He gave the name *Anomalopteris spicata* to De Candolle's *Heteropteris*? *Smeathmanni*, and described two new species: *A. obovata* from Sierra Leone, and *A. longifolia* from Guinea (Island of St. Thomas).

1834. Arnott (Ann. Sci. Nat. sér. 2, ii. 236) pointed out that the genus *Acridocarpus* was the same as *Anomalopteris*, and observed that *Acridocarpus plagiopterus* Guill. et Perr. was apparently identical with *Anomalopteris obovata* G. Don.

1843. Adrien de Jussieu (Archiv. Mus. d'Hist. iii. 482, t. 15) published his monograph of the *Malpighiaceæ*, in which he extended the limits of the genus *Acridocarpus* so as to include three new species, which differed from typical *Acridocarpus* in having opposite leaves, umbellate inflorescence, and three styles; the three species are *A. angolensis*, *A. galphimifolius*, and *A. pruriens*; they constitute Jussieu's second section of the genus.

Jussieu enumerated, in his first section, nine species belonging to typical *Acridocarpus*, four of which were new—*A. natalitius* (Krauss, No. 261), *A. adenophorus*, *A. orientalis*, and *A. excelsus*. The five remaining species of typical *Acridocarpus* enumerated by Jussieu are *A. plagiopterus*, *A. Smeathmanni*, *A. Cavanillesii*, *A. guineensis*, and *A. zanzibaricus*. *A. Cavanillesii* was founded by Jussieu on the description and figure of the fruit of *Banisteria Leona* Cav.; he stated that it was allied to *A. Smeathmanni*, from which it differed in the shape of the samara. [The other parts of Cavanilles's *Banisteria Leona* were considered by Jussieu to belong to a species of *Heteropteris*, which he named *H. africana*.] *A. guineensis* was founded by Jussieu on material communicated to him by Vahl, which he identified with *Malpighia alternifolia* Schum. et Thonn.; and *A. zanzibaricus* was founded on *Banisteria zanzibarica* Bojer.

Jussieu stated that Guillemain and Perrottet had referred *Malpighia alternifolia* to *A. plagiopterus*; he remarked that it was nearer to *A. Smeathmanni*, and that it differed from both *A. plagiopterus* and *A. Smeathmanni* in the shape and thickness of the leaves, which had larger glands on the lower surface than in the other two species. As a matter of fact, Guillemain and Perrottet referred *M. alternifolia*, doubtfully, to *A. Smeathmanni*—see above.

In a note under *A. guineensis*, Jussieu added a suggestion that *Anomalopteris longifolia* G. Don was possibly referable to *Acridocarpus guineensis*.

Finally, he described, at the end of the genus, a doubtful species, *A. ? argyrophyllus*, from Madagascar; the specimens examined by Jussieu had male flowers, which made him doubtful as to the propriety of placing the species in *Acridocarpus*.

1844. Hochstetter (in Flora, xxvii. 296) described Krauss, No. 261, as a new species of *Banisteria*, *B. Kraussiana*, being evidently unaware that Jussieu had, in the previous year, founded *Acridocarpus natalitius* upon the same number.

1848. Planchon (in Hook. Ic. Pl. viii. t. 774) described and

figured *Acridocarpus corymbosus* Hook. fil. MS., from specimens collected by Vogel at Cape Coast Castle; he distinguished it from *A. Smeathmanni* by the short solitary inflorescences, and from *A. Cavanillesii* by the very obtuse calyx lobes.

1849. Hooker fil. (in *Niger Flora*, 244, t. 24) enumerated five species of *Acridocarpus*, with synonymy and citation of specimens—1, *plagiopterus*; 2, *Smeathmanni*; 3, *longifolius*; 4, *guineensis*; 5, *corymbosus*. He transferred *Anomalopteris longifolius* G. Don to *Acridocarpus*, giving it the name *Acridocarpus longifolius*, and re-described it, remarking that Don's description was insufficient and inaccurate. Hooker identified with *Acridocarpus guineensis* Juss., Fernando Po specimens collected by Vogel, and re-described the species from Vogel's material. He also gave a description and figure of *Acridocarpus corymbosus*, the figure being the same as that which accompanied Planchon's description in 1848.

Finally, he remarked:—"The other W. African species of the genus are, *A. Cavanillesii*, Adr. Juss., from Sierra Leone; *A. angolensis*, Adr. Juss., from Angola, and an undescribed Senegambian species in the Hookerian Herbarium collected by Heudelot." Heudelot's specimen has since been identified as *A. plagiopterus*.

1850. Sonder (in *Linnæa*, xxiii. 22) reduced *Banisteria Kraussiana* Hochst. to *Acridocarpus natalitius* Juss.

1859. Harvey (*Thes. cap. i. 12, t. 19*) re-described and figured *A. natalitius* Juss.

1860. Sonder (*Flora Capensis*, i. 231) gave descriptions of the three South African species recognized at that date.

1862. Hooker fil. (in *Gen. Plant.* i. 249, 256) re-defined *Acridocarpus*, and estimated the number of species at twelve. He separated Jussieu's second section of *Acridocarpus* [which included *A. angolensis*, *galphimifolius*, and *pruriens*] as a new genus, *Sphedamnocarpus* Planch. MS., distinguished from *Acridocarpus* proper² by the possession of opposite leaves, umbellate flowers, and three styles, characters already given by Jussieu.

1868. Oliver (*Fl. Trop. Afr.* i. 277), described five species as natives of Tropical Africa, viz., *A. Smeathmanni*, *A. plagiopterus*, *A. corymbosus*, *A. zanzibaricus*, and a new species, *A. chloropterus* Oliv., collected by Kirk and Meller in the valley of the Shire River. He reduced *A. longifolius* to *A. Smeathmanni*, and recognized two varieties of the latter species, which he characterized as follows:—Var. α. Wing of the fruit narrowed to the nut. Var. β. Base of the wing half clasping the nut. He also reduced to *A. Smeathmanni*, *A. guineensis* Juss., and, doubtfully, *A. Cavanillesii* Juss. In a note at the end of the genus he mentioned, as a possible new species, a specimen from the "Red Sea," collected by Dr. Nimmo and labelled *A. orientalis* by Grisebach.

1874. Baillon (*Adansonia*, xi. 248) described a new species from New Caledonia—*A. austro-caledonicus*.

1880. Spencer Moore (in *Journ. Bot.* xviii. 1) described a new species from Liberia—*A. Hirundo*.

1888. Balfour fil. (in *Trans. Roy. Soc. Edinb.* xxxi. 41) enumerated, under the name *A. orientalis* Juss., Dr. Nimmo's "Red Sea"

specimen, his own No. 272 and Schweinfurth's No. 454—all from Socotra.

1890. Niedenzu (in Engler & Prantl, *Pflanzenfamilien*, iii. 4, 60) gave a somewhat modified definition of the genus, and estimated the number of species at eleven.

1894. Baillon (*Hist. Nat. Pl. Madagascar*, Atlas, t. 267) figured a new species from Madagascar—*A. Humblotii*.

1895. Engler and Niedenzu (*Die Pflanzenwelt*, C, 232) enumerated only a single species, *A. zanzibaricus*, as occurring in Tropical East Africa, omitting *A. chloropterus* Oliv., apparently through inadvertence.

1896. Oliver (in Hook. *Ic. Pl.* tt. 2432-3) redescribed and figured *A. orientalis* Juss., and distinguished the Socotra specimens referred by Balfour fil. to *A. orientalis* as a new species, *A. socotranus*, which he also described and figured.

1900. De Wildeman and Durand (*Comptes-rendus Soc. Roy. Bot. Belgique*, xxxviii. 28) described *A. rudis*, a new species from the Congo Free State.

1902. De Wildeman (*Ann. Mus. Congo*, Bot. sér. 4, p. 27, t. 1) described and figured a new species from the Congo Free State, *A. katangensis*, which he stated was allied to *A. plagiopterus*.

1902. Engler (*Ann. R. Istit. bot. di Roma*, ix. 253) described *A. glaucescens*, a new species from Somaliland, which he stated to be allied to *A. zanzibaricus*.

1905. Engler (*Bot. Jahrb.* xxxvi, 250) described four new species and two new varieties of *Acridocarpus*—two species (*A. ferrugineus* and *A. Scheffleri*) from Tropical East Africa, and two (*A. macrocalyx* and *A. brevipetiolatus*) from the Cameroons. The two new varieties were *A. Smeathmanni* var. *Staudtii* and *A. Smeathmanni* var. *Dusenii*.

NOTES ON CERTAIN LESS KNOWN SPECIES.

From the foregoing summary it may be gathered that, altogether, twenty-seven species of *Acridocarpus* have been published up to the present date. Three of them, viz., *A. angolensis*, *A. galphimifolius*, and *A. pruriens*, have long been recognized as constituting a separate genus, *Sphedamnocarpus*. Two of the other species described by Jussieu need special mention. *A.?* *argyrophyllus* Juss. is, from the description, evidently not an *Acridocarpus*. A specimen in the Kew Herbarium, collected at Ambarasaha, Madagascar, by Bojer, agrees very well with Jussieu's description. Like the specimen examined by Jussieu, it has only male flowers. Unisexual flowers are of such rare occurrence in *Malpighiaceæ*, that our choice is narrowed down to the genera *Triaspis* and *Microsteira*, and from the habit, I have little hesitation in referring *A.?* *argyrophyllus* to the former. It may possibly be one of the species figured by Baillon in his *Histoire des Plantes de Madagascar*, tt. 268-270. *A. adenophorus* Juss. is a doubtful species, known to me only from Jussieu's description. It has glands on the bracteoles, and anthers which dehisce by longitudinal slits instead of by terminal pores. Jussieu described a variety β *porantherus*, which differed from the

type in having flowers only two-thirds the size and anthers dehiscing by an apical pore. It seems as though Jussieu had included two distinct species in *A. adenophorus*, but this is a matter which can only be settled by examination of the types in the Paris Herbarium.

The remaining described species of *Acridocarpus* seem to have been rightly referred to the genus. Three of them—*A. Cavanillesii*, *A. guineensis*, and *A. longifolius*—have been greatly misunderstood. *A. Cavanillesii* is almost certainly a variety or form of *A. plagiopterus*. A specimen in the British Museum, collected by Smeathman in Sierra Leone, was identified by Planchon as *A. Cavanillesii*, and is named in his handwriting *A. plagiopterus* var. *Cavanillesii*. The identification and reduction were, however, never published. The specimen has the characteristic bracts and bracteoles of *A. plagiopterus*, which, outside that species, occur only in *A. macrocalyx* and *A. Hirundo* (see below). It agrees with the figures given by Cavanilles and Jussieu in having all three carpels developed, and in the individual mericarps being considerably compressed laterally. Except in the latter point it agrees with typical *A. plagiopterus*. The third carpel in *A. plagiopterus*, though apparently not usually fertile, is much more developed than in many of the species; the perfect development of all three carpels cannot be accounted a specific character, for we find in at least one species, *A. excelsus* Juss. (*Hildebrandt*, No. 3411 in Herb. Kew.), either one, two, or three mericarps developed in the same infructescence.

As stated above, *A. guineensis* was founded, *firstly*, on material sent to Jussieu by Vahl; and, *secondly*, on *Malpighia alternifolia* Schum. et Thonn.

From a careful study of Schumacher's diagnosis and Thonning's description of *Malpighia alternifolia*, I have come to the conclusion that it is conspecific with *Acridocarpus corymbosus* Hook. fil.

Guillemin and Perrottet referred it, doubtfully, to *A. Smeathmanni*, and Oliver followed them, remarking, however, that it might possibly be identical with *A. corymbosus*. There are three points in Schumacher and Thonning's description which suit *A. corymbosus* better than *A. Smeathmanni*, and none which, in my opinion, are more applicable to the latter. The points in favour of *A. corymbosus* are: 1, leaves oblong; 2, inflorescence a corymb or corymbose raceme; 3, peduncle elongated. Evidence of a negative character against *A. Smeathmanni* is that Thonning makes no mention of the rhachis of the inflorescence being *nodose*, which is a striking character in *A. Smeathmanni*.

Turning now to Jussieu's remarks under *A. guineensis*, we find that he distinguished that species from *A. Smeathmanni* (and *A. plagiopterus*) by its thicker leaves and by the larger glands on their lower surface. It is evident that Jussieu made the comparison from Vahl's specimen, since Thonning's type, seen by Jussieu, had no leaves, and since there is no reference to *Heteropteris*? *Smeathmanni* in Schumacher and Thonning's description of *Malpighia alternifolia*. Now *A. corymbosus* differs from *A. Smeathmanni* in the two points mentioned by Jussieu as distinguishing *A. guineensis*,

and agrees with Jussieu's description of the latter, as far as it goes; and since Jussieu had seen Thonning's type, we are entitled to assume, in the absence of any evidence to the contrary, that his identification of Vahl's specimen with *M. alternifolia* was correct. We now have, therefore, five points in favour of the identity of *A. guineensis* with *A. corymbosus* and against its being conspecific with *A. Smeathmanni*.

The only other species of *Acridocarpus* which might, with some show of reason, be identified with *A. guineensis* is *A. longifolius* Hook. fil.; it differs, however, from both Jussieu's and Thonning's descriptions in having only a single gland on the calyx, and from Thonning's description in the larger leaves and more elongated inflorescence, and it cannot, therefore, be conspecific with *A. guineensis*.

A. longifolius has perhaps been more misunderstood than any other species of *Acridocarpus*. Hooker fil. identified Fernando Po specimens of *A. longifolius* with *A. guineensis* Juss.; Oliver reduced it to *A. Smeathmanni*; and Engler has described different specimens of it, respectively, as a new species, *A. brevipetiolatus*, and as a new variety, *A. Smeathmanni* var. *Dusenii*.

Hooker does not state wherein "*A. guineensis*" differs from *A. longifolius*; a comparison of his descriptions of the two species yields, however, the following points of difference:—

<i>A. longifolius.</i>	" <i>A. guineensis.</i> "
1. Perfectly glabrous.	Uppermost parts puberulous.
2. Branches slender.	Branches stout.
3. Leaves linear-oblong, membranous, reticulate on the upper surface.	Leaves linear-lanceolate, coriaceous, smooth on the upper surface.
4. Racemes terminal.	Racemes lateral.

The first point of difference is disposed of by the fact that an undoubted specimen of *A. longifolius*, collected at the *locus classicus* (St. Thomas) by Quintas, has the uppermost parts just as puberulous as in "*A. guineensis*." The fourth distinction is broken down by the fact that terminal and lateral racemes sometimes occur on the same specimen (Mann, Gaboon River, in Herb. Kew.). The remaining differences are such as one might expect to find on different individuals of the same species, or even on the same individual, on parts of different age. The Kew series of specimens of *A. longifolius* exhibits numerous intermediates in the shape, texture and reticulation of the leaves between the extreme forms represented by Mann's Gaboon River plant and Vogel's No. 195 from Fernando Po. The differences in the thickness of the branches are but slight.

Let us now consider Oliver's reduction of *A. longifolius* to *A. Smeathmanni*. Oliver described two varieties of *A. Smeathmanni*, var. *a* with the wing of the fruit narrowed to the nut, and var. *β* with the base of the wing half clasping the nut. Though Oliver does not state so, an examination of the specimens quoted by him

shows that his var. α corresponds to the true *A. Smeathmanni*, and his var. β to *A. longifolius*. In reality the relationship between *A. Smeathmanni* and *A. longifolius* is not at all close; the two species differ markedly from one another in the shape, size and venation of the leaves, in the bracts, the inflorescence and the calyx, as well as in the fruit characters given by Oliver.

Although I have not seen the type-specimens, I have ventured to reduce *A. Smeathmanni* var. *Dusenii* Engl. to *A. longifolius* for two reasons: firstly, because Engler's description agrees well with *A. longifolius*, notably in the mention of the large solitary gland on the calyx; and, secondly, because there is a specimen of *A. longifolius* in the Kew Herbarium, collected at precisely the same locality (Sibange Farm), as one of Engler's types.

In the case of *A. brevipetiolatus* Engl., I have seen the type (Zenker, No. 2798), which is represented both at Kew and at the British Museum, and I cannot distinguish it from *A. longifolius*. Engler describes two of the sepals as each having a pair of small glands on the back, but I find a single large gland on the calyx, just as in *A. longifolius*, or, less frequently, two large glands.

By the exclusion of four species from the genus and the reduction of three others, the number of recognized species is now reduced to twenty, to which have to be added three new ones described in the present paper. As I have seen specimens of only sixteen out of the twenty-three, a monographic treatment of the subject is out of the question, but a few remarks on the generic characters and the inter-relationships of the species may be of assistance to future workers.

GENERAL REMARKS.

There is no uncertainty concerning the taxonomic position of *Acridocarpus*; it belongs to the tribe *Pyramidotoræ* (which is characterized by the mericarps being borne on a pyramidal torus), and is the only genus with alternate leaves in the tribe. Hooker fil. states that the leaves are sometimes opposite, but Niedenzu describes them as always alternate, and I know of no instance of the occurrence of opposite leaves in the genus. Hooker states that the radicle is hidden by the cotyledons (*retracta*), but this is not always the case; in *A. Smeathmanni* var. *Staudtii*, for example, the radicle is distinctly exserted (Staudt, No. 498 in Herb. Kew.). Both Hooker and Niedenzu describe one carpel as being always abortive, but all three carpels may be developed, as occurs in *A. excelsus* and *A. plagiopterus* var. *Cavanillesii*, for example. Niedenzu describes the bracteoles of *Acridocarpus* as being very small, which is hardly the case in *A. plagiopterus* and its allies. The descriptions of *Acridocarpus* in the *Genera Plantarum* and *Pflanzenfamilien* call for no further remark.

Among the best specific characters are those afforded by the bracts and bracteoles, the glands on the calyx, and the shape and reticulation of the leaves. The flowers are very uniform in structure, and, apart from the calyx, afford few diagnostic characters. The fruits seem to be of considerable taxonomic importance, but a large

allowance has to be made for individual variations in shape and size, and the young fruits are often very different in shape from the mature ones.

Four more or less natural groups of species can be distinguished. The first group consists of *A. plagiopterus*, *A. Hirundo*, and *A. macrocalyx*, and is characterized by the very conspicuous *spreading* bracts and bracteoles of nearly equal length; the bracts are ovate-oblong, very concave above, and the bracteoles are narrowly oblong-spathulate. *A. plagiopterus* and *A. Hirundo* are very closely allied, and may have to be united when further material comes to hand. *A. macrocalyx* differs from both of them in having less appressed hairs, as well as in the larger size of the calyx and leaves.

The remaining groups have *ascending* (or nearly erect) bracts and bracteoles; the second group is founded on *A. Smeathmanni*, which has minute ovate bracts and bracteoles, the bracteoles being glandular outside. As a species, *A. Smeathmanni* is characterized by a tendency towards aggregation of the racemes into panicles, by the nodose appearance of the rhachis after the pedicels have fallen off, and by the *thinly* coriaceous, obovate, very shortly and obtusely acuminate leaves. The only other species in the second group is *A. congolensis*, which differs from *A. Smeathmanni* in having the inflorescence contracted into a corymb, and in the wing of the fruit being less narrowed towards the base. Both the species show a gradual transition from leaves into bracts.

The third group is rather a large one, and is only provisional; the species for the most part have subulate or lanceolate bracts and bracteoles, and more or less coriaceous leaves, which have a rather close and often conspicuous network of veins. The most central form seems to be *A. zanzibaricus*. The group may be subdivided as follows:—(A.) *A. corymbosus* and *A. longifolius*, characterized by having short racemes with a stout rhachis on which the small subulate bracts and bracteoles are *crowded*; the leaves are more or less oblong, and are very closely and strongly reticulated. The two species are very closely allied; they differ chiefly in the glands on the calyx, the length of the inflorescence, the size of the leaves, and the stoutness of the petioles. (B.) *A. zanzibaricus* has more elongated racemes than the preceding, and longer and less crowded bracts and bracteoles; the leaves are obovate and (usually) apiculate, and are of the same colour on both surfaces. (C.) *A. ugandensis* has shorter inflorescences than *A. zanzibaricus*, and less coriaceous elliptic-oblong leaves; the bracts and bracteoles are shorter; the rhachis is slenderer and the flowers are less crowded than in subdivision A. I regard *A. ugandensis* as intermediate between *A. longifolius* and *A. zanzibaricus*, and as perhaps nearer to the latter. (D.) *A. natalitius* approaches *A. zanzibaricus* in the inflorescence, bracts, and bracteoles, but has a more conspicuously nodose rhachis and narrower often oblanceolate leaves, which are much paler on the lower surface than on the upper. (E.) *A. chloropterus* differs from *A. natalitius* in its elongated oblong leaves, which are rounded at the base, and more or less pubescent on the lower surface. (F.) *A. hemicyclopterus* differs from all the other species of the

genus in the semicircular wing of its fruit. It is perhaps distantly allied to *A. zanzibaricus*, but recedes in the pubescence of the leaves, the great prominence of the veins on the lower surface, and the longer bracts and bracteoles. (G.) *A. socotranus* and *A. orientalis*, two species bearing a strong superficial resemblance to each other. They have small coriaceous elliptic-obovate or oblong leaves, very strongly and closely reticulated on both surfaces, and much less crowded flowers than *A. longifolius* and *A. corymbosus*, in which the reticulation of the leaves is similar. *A. socotranus* has elliptic or shortly obovate glabrous leaves, a slender rhachis, and subulate bracts; *A. orientalis*, more oblong leaves, hairy on the lower surface, a stouter rhachis, and oblong bracts.

The fourth group consists of *A. austro-caledonicus* and *A. excelsus*. Both are trees with oblanceolate leaves, silky tomentose on their lower surface; the inflorescences are short, and the bracts minute and deltoid. The racemes of *A. austro-caledonicus* terminate the leafy branches, while those of *A. excelsus* are borne on the wood of the previous year. The lateral veins of the leaves are more oblique in *A. excelsus* than in *A. austro-caledonicus*.

All the species of *Acridocarpus* of which I have seen specimens are accounted for in the preceding four groups. Of the remaining seven species, *A. katangensis* is, from the figure and description, almost certainly closely allied to *A. chloropterus*; *A. Humblotii* belongs to the third group, and is probably allied to *A. zanzibaricus*, judging by the figure; *A. Scheffleri* and *A. glaucescens* are stated by Engler to be allied to *A. zanzibaricus*; and *A. rudis* is said by De Wildeman and Durand to be very near *A. Smeathmanni*. The affinities of *A. adenophorus* and of *A. ferrugineus* are doubtful.

The distribution of the species is as follows:—Nine in West Tropical Africa, seven in East Tropical Africa, three in Madagascar, and one each in Natal, Socotra, Arabia, and New Caledonia. The first two groups of species are confined to West Africa, the fourth has one species in Madagascar and a second in New Caledonia, and the third group has its centre and greatest development in East Tropical Africa, with outlying representatives in West Africa, Socotra and Arabia, Natal and Madagascar.

Three pairs of representative species occur in West Tropical Africa, viz., *plagiopterus* (Senegambia to Sierra Leone) and *macrocalyx* (Cameroons); *Smeathmanni* (Sierra Leone to the Cameroons) and *congolensis* (Lower Congo); *corymbosus* (Sierra Leone to Nigeria) and *longifolius* (Lagos to Angola). In none of the three pairs do the areas occupied by the species overlap.

It should be noted that I have not attempted to arrange the species according to their affinities in the enumeration which follows, though in certain cases nearly allied species happen to be placed side by side; the key has been drawn up solely with a view to the ready determination of the species. Where I have not seen a specimen, the authority for its citation is given. Except where otherwise stated, the specimens cited are in the Kew Herbarium:—

CLAVIS SPECIERUM.

- A. Folia linearia vel oblongo-linearia, haud 1 cm. lata.
- I. Folia glabra 1. *glaucescens*.
- II. Folia subtus ferrugineo-villosa 2. *ferrugineus*.
- B. Folia oblanceolata.
- I. Folia glabra 3. *natalitius*.
- II. Folia subtus sericea vel tomentosa.
- a. Pedicelli haud 1 cm. longi 4. *austro-caledonicus*.
- b. Pedicelli 1.5–2 cm. longi 5. *excelsus*.
- C. Folia oblonga, oblongo-lanceolata, obovata vel elliptica.
- I. Rami et petioli squamis asperati 6. *rudis*.
- II. Rami et petioli squamis carentes.
- a. Folia glabra.
- i. Inflorescentia corymbosa; rhachis 2 cm. longus vel infra (rarius usque 5 cm. longus).
- a. Folia tenuiter coriacea, crebre conspicue reticulata 7. *corymbosus*.
- β. Folia chartacea, haud crebre reticulata 8. *congolensis*.
- ii. Inflorescentia haud corymbosa; rhachis ± elongatus.
- a. Folia apice rotundata vel obtusissima, haud acuminata.
1. Folia late obovata vel elliptica 9. *socotranus*.
2. Folia obovato-vel elliptico-oblonga.
- * Folia conspicue ascendentia, obovato-oblonga, usque 4 cm. lata, plerumque multo angustiora 3. *natalitius*.
- ** Folia patentia, elliptico-oblonga, 4–7.5 cm. lata 10. *ugandensis*.
- β. Folia apice acuminata vel cuspidata (in *A. zanzibarico* alia cuspidata alia retusa).
1. Bracteæ bracteolæque ascendentes.
- * Bracteæ ovatae 1.5–2 mm. longæ; rhachis post delapsum pedicellorum conspicue nodosus 11. *Smeathmanni*.
- ** Bracteæ subulatæ, 1–2 mm. longæ.
- † Folia 7–27 cm. longa, acuminata; petiolus crassus, pro lamina brevissimus 12. *longifolius*.
- †† Folia 5–11 cm. longa, cuspidata vel rarius retusa; petiolus nec crassus nec pro lamina brevissimus 13. *zanzibaricus*.
- *** Bracteæ lanceolatae, 5–8 mm. longæ 14. *Scheffieri*.
2. Bracteæ bracteolæque post anthesin patentibus vel ± reflexæ 19. *plagiopterus*.

b. Folia subtus $\pm$ hirsuta, statu juvenili certe.

i. Folia oblonga vel oblongo-lanceolata.

a. Folia utrinque crebre conspicue reticulata 15. *orientalis*.

β . Folia haud crebre reticulata.

1. Pedicelli 10–13 mm. longi . 16. *chloropterus*.

2. Pedicelli 20–25 mm. longi . 17. *katangensis*.

ii. Folia obovata vel elliptica.

a. Bracteæ subulatæ 18. *hemicyclopterus*.

β . Bracteæ ovatæ vel oblongæ.

1. Ala mericarpii 4–5 cm. longa.

* Sepala 3–3.5 mm. longa . 19. *plagiopterus*.

** Sepala 6–6.5 mm. longa . 20. *macrocalyx*.

2. Ala mericarpii 6–7 cm. longa . 21. *Hirundo*.

Species minus cognitæ, madagascarienses { 22. *adenophorus*.
23. *Humblotii*.

1. *A. GLAUDESCENS* Engl. in Ann. Ist. Bot. Roma, ix. 253 (1902).

Hab. SOMALILAND: Dar, near Barden, *Riva in coll. Ruspoli*, no. 206 (ex Engler).

Said to be allied to *A. zanzibaricus* by Engler.

2. *A. FERRUGINEUS* Engl. in Engl. Bot. Jahrb. xxxvi. 250 (1905).

Hab. SOMALILAND: Gara Libin, near Wonte, on stony wooded hills, *Ellenbeck*, no. 2207 (ex Engler).

3. *A. NATALITIUS* A. Juss. in Arch. Mus. Par. iii. (1843), 486 (Monogr. Malpigh. 232); Walp. Rep. v. 287; Sonder in Linnæa, xxiii. 22; Harv. Thes. Cap. i. 12, t. 19; Sonder in Harv. et Sond. Fl. Cap. i. 231; Hook. fil. Bot. Mag. t. 5738.

Banisteria Kraussiana Hochst. in Flora, xxvii. (1844), 296.

Hab. NATAL: *Gerrard*, no. 603; *Sanderson*. Coast-land, lat. 30° S., *Sutherland*. Port Natal, *Gueinzius*; *Plant*, no. 26; *Krauss*, no. 261; *Peddie*. Durban, *Cooper*, no. 2020. Inanda, *J. M. Wood*, no. 217.

4. *A. AUSTRO-CALEDONICUS* Baill. in Adansonia, xi. 248.

Hab. NEW CALEDONIA: *Balansa*, nos. 1039, 1475, 1688 (ex Baillon); *Pancher*; *Caldwell*. Pum Peninsula, *Deplanche*, no. 267. On banks of torrents near Gatope, *Vieillard*, no. 249 (Brit. Mus.).

5. *A. EXCELSUS* A. Juss. in Arch. Mus. Par. iii. (1843), 489, t. 15 (Monogr. Malpigh. 235); Walp. Rep. v. 288; Baill. Hist. Pl. Madag. t. 266.

Banisteria arborea Bojer ex A. Juss. l. c.

Hab. MADAGASCAR: in woods at Bombatoka, *Bojer*. Near Mazangay, *Bojer*. On sterile, grassy plains near Mojanga, *Hildebrandt*, no. 3411. N.W. Madagascar, *Baron*, nos. 5715, 5677.

Native name, "Suhihi."

6. *A. RUDIS* Wildem. et Dur. in Compt. Rend. Soc. Bot. Belg. xxxviii. 28.

Hab. CONGO FREE STATE: Lower Congo, Chinganga, *Dewèvre* (ex Wildem. et Dur.).

Said to be very near *A. Smeathmanni*.

7. *A. corymbosus* Hook. fil. ex Planch. in Hook. Ic. Pl. t. 774; Hook. fil. in Hook. Niger Fl. 246, t. 24; Walp. Ann. i. 131; Oliv. Fl. Trop. Afr. i. 278, *partim*.

A. guineensis A. Juss. in Arch. Mus. Par. iii. (1843), 485 (Monogr. Malpigh. 231).

Malpighia alternifolia Schum. et Thonn. Beskr. Guin. Pl. 222.

Hab. SIERRA LEONE: *Vogel*, no. 177. GOLD COAST: *T. W. Brown*, no. 337; *Johnson*, no. 586. Cape Coast Castle, *Vogel*, no. 12; *Brass* (Brit. Mus.). N. NIGERIA: *Jeba*, on the Quorra [Niger] River, *Barter*. Nupe, *Barter*, no. 507.

If, as I believe, *A. guineensis* and *Malpighia alternifolia* are identical with *A. corymbosus*, a new combination under *Acridocarpus*, with the early and now inappropriate name *alternifolius*, will have to be made. As I have not seen Jussieu's and Schumacher and Thonning's types, I think it best to adopt the name *A. corymbosus*, about which there is no doubt.

8. *A. congolensis*, sp. nov. Frutex 2.5–3 m. altus, ramulis gracilibus, lenticellosis, 1.5–2.5 mm. diametro. Folia obovata vel oblongo-obovata, apice breviter obtuse acuminata, basi obtusa (rarius rotundata), 3–8 cm. longa, 1.75–4 cm. lata, membranacea, demum rigide chartacea, glabra (vena media facie inferiore appresse puberula excepta), supra nitidula, obscure viridia vel brunnea, subtus pallidiora, parum conspicue reticulata, petiolo gracili, nigrescente, 2.5–5 mm. longo, appresse puberulo, supra canaliculato; venæ laterales utrinque 6–7, satis obliquæ, procul a margine anastomosantes, supra satis manifestæ, subtus ut rete laxum venularum prominulæ. Racemi simplices, rhachide usque 1.5 cm. longo, bracteis ovatis, obtusiusculis, 2 mm. longis, 1 mm. latis (fructu lanceolatis, usque 3.5 mm. longis), appresse ferrugineo-pubescentibus, bracteolis late elliptico-ovatis, obtusis, 0.75 mm. longis et latis; pedicelli graciles, 1.5–2 cm. longi, appresse ferrugineo-pubescentes, fructiferi haud elongati. Sepala late elliptica vel suborbicularia, rotundata, 3–4 mm. longa et lata, margine minutissime obsolete ciliolata, ceterum glabra. Petala late obovata vel suborbicularia, 12–13 mm. longa, 9.5–11 mm. lata, lacerata, ungue petalorum majorum usque ad 1.5 mm. longo, minorum subnullo. Antheræ minute apiculatæ, 4–5 mm. longæ, 1.75–2 mm. latæ, exteriores subsessiles, interiores filamentis 0.75 mm. longis. Ovarium 1.5 mm. altum, ferrugineo-tomentosum, stylo abortivo 2 mm. longo, stylis duobus perfectis 11 mm. longis, incurvis, angulo acuto divergentibus. Mericarpia facie interna elliptica vel suborbiculari, 6–7 mm. longa, 4.5–5 mm. lata, ala 2.3–3 cm. longa, 1–1.5 cm. lata, vivide rubra, basi sparse puberula. — *A. corymbosus* Oliv. Fl. Trop. Afr. i. 278, *partim*, non Hook. fil.

Hab. CONGO: *Christian Smith*; *Consul Burton*. Below Stanley Pool, *H. H. Johnston*.

9. *A. socotranus* Oliv. in Hook. Ic. Pl. t. 2433.

A. orientalis Balf. fil. Bot. Socotra, 41, non Juss.

Hab. SOCOTRA: *Schweinfurth*, no. 454; *Nimmo*; *Bent*. On the Haghier Hills, *Balfour*, no. 272.

The locality given for Nimmo's specimen is merely "Red Sea," but there is little doubt that it came from Socotra.

10. *A. ugandensis*, sp. nov. Frutex erectus, 2-3 m. altus, ramulis crassiusculis lenticellosis, novellis ferrugineo-pubescentibus, internodiis superioribus contractis. Folia patentia, elliptico-oblonga, apice rotundata $\pm$ recurva, basi rotundata vel obtuse cuneata, 10-18 cm. longa, 4-7.5 cm. lata, coriacea, glabra, supra brunneo-viridia, venis parum conspicuis, subtus pallidiora, venis prominentibus, venulis prominulis satis crebre reticulata, glandulis majusculis hinc inde immersis, petiolo crassiusculo 5-6 mm. longo, supra excavato, supra et lateribus ferrugineo-pubescente, subtus glabro; venæ laterales patentes, majores utrinque 11-13, satis procul a margine anastomosantes. Racemi usque 9 cm. longi, terminales et laterales, rhachide ferrugineo-tomentello, bracteis anguste triangularibus, 2-2.5 mm. longis, basi 1 mm. latis, obtusis, extra tomentellis, intus glabriusculis, infimis oblongo-linearibus, semiteretibus, usque 6 mm. longis, obtusis, ubique tomentellis, bracteolis 1 mm. longis, pedicellis 1.6-2 cm. longis, gracilibus, subappresse pubescentibus. Sepala late elliptica, rotundata, 4-5 mm. longa, 3-4.5 mm. lata, minute ciliata, extra minute puberula, intus glabra, 1-2 eorum basi glandulosa. Petala late obovata, 14-16.5 mm. longa, 10-12 mm. lata, ungue petalorum majorum usque ad 2.5 mm. longo, minorum subnullo. Filamenta 1.5-2.5 mm. longa; antheræ 4.5-5.5 mm. longæ, 1.5-2 mm. latæ, apiculatæ, apiculo sæpe incurvo. Ovarium trigono-globosum, 3-3.5 mm. altum, tomentosum, stylo abortivo vix 0.5 mm. longo, stylis duobus perfectis angulo acuto divergentibus, 10-11 mm. longis, apice leviter incurvis.

Hab. UGANDA: Nile Province, Bari Country, *Dawe*, no. 942.

11. *A. SMEATHMANNI* Guill. et Perr. Fl. Seneg. i. 124; *A. Juss.* in Arch. Mus. Par. iii. (1843), 484, t. 15 (Monogr. Malpigh. 230); Walp. Rep. v. 286; Oliv. Fl. Trop. Afr. i. 277, *partim* (var. α).

Heteropteris? *Smeathmanni* DC. Prodr. i. 592.

Anomalopteris spicata G. Don, Gen. Syst. i. 647.

Hab. SIERRA LEONE: *Don*; *Smeathman* (Brit. Mus.); *Whitfield* (Brit. Mus.); *Afzelius* (Brit. Mus.). Bush on hill-sides about 200 ft. above sea-level, near Freetown, *H. H. Johnston*, no. 48. Scarcies, near Layah, *Scott Elliot*, no. 4661. GOLD COAST: Koforidua, *Johnson*, no. 497. Accra Plains, *Johnson*, no. 613. Togo: Near Lome, *Warnecke*, no. 401. LAGOS: *Moloney*; *Barter*, no. 20137. Lagos Island, *Barter*, no. 20217. Abbeokuta, *Rowland*. NIGERIA: Niger River, *Baikie*.

Var. *STAUDTH* Engl. in Engl. Jahrb. xxxvi. 251; imprimis foliis majoribus (10-17 cm. longis) a typo recedit.

Hab. CAMEROONS: Johann-Albrechtshöhe, *Staudt*, no. 498.

12. *A. LONGIFOLIUS* Hook. fil. in Hook. Niger Fl. 244; Walp. Ann. ii. 204.

A. Smeathmanni Oliv. Fl. Trop. Afr. i. 277, *partim* (var. β).

A. Smeathmanni var. *Dusenii* Engl. in Engl. Jahrb. xxxvi. 251.

A. brevipetiolatus Engl. l. c. 252.

A. guineensis Hook. fil. in Hook. Niger Fl. 245, non Juss.

Anomalopteris longifolia G. Don, Gen. Syst. i. 647.

Hab. LAGOS: *Barter*, no. 20196; *Millen*, no. 145. S. NIGERIA: Brass, *Barter*, no. 3701. Left bank of the mouth of the Niger River, *Mann*, no. 467. CAMEROONS: *Dusén*, no. 8 (ex Engler, sub *A. Smeathmanni* var. *Dusenii*). Bipinde, *Zenker*, no. 2798. FRENCH CONGO: Gaboon River, *Mann*. Munda region, Sibange Farm, *Soyaux*, no. 235; *Dinklage*, no. 587 (ex Engler, sub *A. Smeathmanni* var. *Dusenii*). CONGO: *Christian Smith* (Brit. Mus.). ANGOLA: Cuanze River, *Gossweiler*, no. 1620 (Brit. Mus.). FERNANDO PO: *Vogel*, nos. 125, 195. ST. THOMAS: *Don*; *Quintas*, no. 48.

13. *A. ZANZIBARICUS* A. Juss. in Arch. Mus. Par. iii. (1843), 485, t. 15 (Monogr. Malpigh. 231); Walp. Rep. v. 286; Oliv. Fl. Trop. Afr. i. 279.

A. sansibaricus Engl. et Nieden zu in Engl. Pflanzenw. Ost-Afr. A. 75, B. 529, C. 232.

Banisteria zanzibarica Bojer ex Loud. Hort. brit. 182.

Hab. ZANZIBAR: *Kirk*, no. 33. Sandy ground, especially on dunes, *Hildebrandt*. no. 1151. GERMAN EAST AFRICA: At the edge of coast woods, Mssekere (Dar-es-Salaam) (ex Engler et Nieden zu). Nyika Country, *Wakefield*. Usambara; cultivated ground at Bombuera, *Holst*, no. 2172. BRITISH EAST AFRICA: Witu, *Thomas Denhardt*, no. 131 (Brit. Mus.).

14. *A. SCHEFFLERI* Engl. in Engl. Jahrb. xxxvi. 251.

Hab. GERMAN EAST AFRICA: In semi-shaded places on weathered granite soil at Derema, about 800 m. alt., *Scheffler*, no. 161 (ex Engler).

Said to be allied to *A. zanzibaricus*.

15. *A. ORIENTALIS* A. Juss. in Arch. Mus. Par. iii. (1843), 488 (Monogr. Malpigh. 234); Walp. Rep. v. 287; Oliv. in Hook. Ic. Pl. t. 2432.

Hab. ARABIA: Muscat, *Aucher-Eloy*, no. 4294. Dhofar Mountains, *Bent*, no. 118.

16. *A. CHLOROPTERUS* Oliv. Fl. Trop. Afr. i. 279.

Hab. PORTUGUESE EAST AFRICA: Lower valley of Shire River, *Meller*. Among the dense bush near the site of the village of Shamo (Shire River), *Kirk*.

17. *A. KATANGENSIS* Wildem. Etudes Fl. Katanga, 27, t. 1 (Ann. Mus. Congo, Sér. iv.).

Hab. CONGO FREE STATE: Katanga; Lukafu, *Verdick* (ex Wildeman).

18. *A. hemicyclopterus*, sp. nov. Rami breviter pubescentes vel fere tomentelli. Folia elliptica vel obovata, apice rotundata vel leviter retusa, $\pm$ cuspidata, basi obtusa vel rotundata, 8-15 cm. longa, 4-9.5 cm. lata, coriacea, supra venulis prominulis creberrime reticulata, sparsiuscule (costa densius) pubescentia, subtus venis et venulis valde prominentibus conspicue crebre reticulata, pubescentia, glandulis inconspicuis hinc inde inspersis, petiolo crassiusculo, 2-4 mm. longo; venæ laterales patentes, majores utrinque 8-10, 5-10 mm. infra marginem anastomosantes. Racemi usque ad 38 cm. longi, tomentelli, bracteis subulatis 4-5 mm. longis, bracteolis conformibus 2-3 mm. longis, pedicellis 1.5 cm. longis, fructi-

feris circa 2 cm. longis. Calyx basi 2-3-glandulosus; sepala elliptica, rotundata (rarius obtusa), 4 mm. longa, 2.5-3.5 mm. lata, extra (medio densius) pubescentia, intus glabra. Petala usque delapsum fructus persistentia, orbiculari-obovata, 11-14.5 mm. longa, 7-9 mm. lata, ungue petalorum majorum usque ad 3.5 mm. longo, minorum subnullo. Filamenta 1-1.5 mm. longa; antheræ 4-4.5 mm. longæ, 1.5 mm. latæ vel vix latiores, apiculatæ, basi subauriculatæ. Ovarium ambitu subquadratum, 2 mm. longum, 2.5 mm. latum, tomentosum, stylis angulo paullo majore quam recto divergentibus, 7-7.5 mm. longis, apice leviter incurvis. Mericarpia facie interna fere circulari, 6 mm. diametro, pubescentia, ala subsemicirculari, ultra 5 cm. longa, 3 cm. lata, puberula, supra magis evoluta.

Hab. GAMBIA: South bank of Gambia River, *Brown-Lester*, nos. 47, 50; north bank, *Ozanne*, no. 5.

19. *A. PLAGIOPTERUS* Guill. et Perr. Fl. Seneg. i. 123, t. 29; *A. Juss.* in Arch. Mus. Par. iii. (1843), 484, t. 15 (Monogr. Malpigh. 230); Walp. Rep. v. 285; Hook. fil. in Hook. Niger Fl. 244; Oliv. Fl. Trop. Afr. i. 278.

Anomalopteris obovata G. Don, Gen. Syst. i. 647.

Hab. SENEGAMBIA: *Perrottet*, no. 94 (Brit. Mus.); *Heudelot*, no. 761. Casamancia, *Leprieur* (ex Guill. et Perr.). SIERRA LEONE: *Don*; *Afzelius* (Brit. Mus.); *Winwood*. On the way to Lester Peak, *Scott Elliot*, no. 3870.

Var. *CAVANILLESII* Planch. MS. in Herb. Mus. Brit.; a typo mericarpiis lateraliter compressis recedit. — *A. Cavanillesii* *A. Juss.* in Arch. Mus. Par. iii. (1843), 484, t. 15 (Monogr. Malpigh. 230). *Banisteria Leona* Cav. Diss. 424, t. 247, quoad fructum, ceteris partibus exclusis.

Hab. SIERRA LEONE: *Smeathman* (Brit. Mus.).

20. *A. MACROCALYX* Engl. in Engl. Jahrb. xxxvi. 250.

Hab. CAMEROONS: Yaunde, *Zenker*, no. 1403. Bipinde, *Zenker*, no. 2472.

21. *A. HIRUNDO* S. Moore in Journ. Bot. 1880, 1.

Hab. LIBERIA: *Carder*.

22. *A. ADENOPHORUS* *A. Juss.* in Arch. Mus. Par. iii. (1843), 487 (Monogr. Malpigh. 233); Walp. Rep. v. 287.

Hab. MADAGASCAR: *Breon* (ex *A. Juss.*).

Var. *PORANTHERUS* *A. Juss. l. c.* 488 (*l. c.* 234); a typo antheris poro apicali dehiscentibus recedit.

Hab. MADAGASCAR: *Chapelier* (ex *A. Juss.*).

23. *A. HUMBLOTII* Baill. Hist. Pl. Madag. t. 267.

Hab. MADAGASCAR: Known only from the figure.

SPECIES EXCLUDENDÆ.

A. angolensis *A. Juss.* = *Sphedamnocarpus angolensis* Planch.

A. argyrophyllus *A. Juss.* = *Triaspis* sp.

A. galphimiæfolius *A. Juss.* = *Sphedamnocarpus galphimiæfolius* Szysz.

A. pruriens *A. Juss.* = *Sphedamnocarpus pruriens* Szysz.

INDEX OF SPECIES AND SYNONYMS.*

Acridocarpus

- adenophorus* *A. Juss.* (22)
 var. *porantherus* *A. Juss.* (22)
austro-caledonicus *Baill.* (4)
brevipetiolatus *Engl.* (12)
Cavanillesii *A. Juss.* (19)
chloropterus *Oliv.* (16)
congolensis *Sprague* (8)
corymbosus *Hook. fil.* (7)
corymbosus *Oliv., partim* (8)
excelsus *A. Juss.* (5)
ferrugineus *Engl.* (2)
glaucescens *Engl.* (1)
guineensis *A. Juss.* (7)
guineensis *Hook. fil.* (12)
hemicyclopterus *Sprague* (18)
Hirundo *S. Moore* (21)
Humblotii *Baill.* (23)
katangensis *Wildem.* (17)
longifolius *Hook. fil.* (12)
macrocalyx *Engl.* (20)
natalitius *A. Juss.* (3)
orientalis *A. Juss.* (15)
orientalis *Balf. fil.* (9)
plagiopterus *Guill. & Perr.* (19)
 var. *Cavanillesii* *Planch.* (19)

Acridocarpus

- rudis* *Wildem. & Dur.* (6)
sansibaricus *Engl. & Niedenzu* (13)
Scheffleri *Engl.* (14)
Smeathmanni *Guill. & Perr.* (11)
 var. *Staudtii* *Engl.* (11)
Smeathmanni *Oliv. (var. a)* (11)
Smeathmanni *Oliv. (var. β)* (12)
 var. *Dusenii* *Engl.* (12)
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ugandensis *Sprague* (10)
zanzibaricus *A. Juss.* (13)

Anomalopteris

- longifolia* *G. Don* (12)
obovata *G. Don* (19)
spicata *G. Don* (11)

Baristeria

- arborea* (5)
Kraussiana *Hochst.* (3)
Leona *Cav. (quoad fructum)* (19)
zanzibarica *Bojer* (13)

Heteropteris?

- Smeathmanni* *DC.* (11)

Malpighia

- alternifolia* *Schum. & Thonn.* (7)

THE STATUS OF SOME BRITANNIC PLANTS.

BY REV. E. S. MARSHALL, M.A., F.L.S.

THE following remarks are intended to supplement Rev. H. J. Riddelsdell's able review (pp. 138-142) of my friend Mr. S. T. Dunn's *Alien Flora of Britain*. This was written under exceptional difficulties, and does great credit to its author; had he remained in England, and been able to consult local botanists more fully, no doubt the result would have been still more valuable. He has, at any rate, given us a good basis to work upon.

In reading through the *Phytologist* (New Series) one sees on what slender grounds some alien species were at one time confidently claimed as natives of this country—e. g., *Arenaria balearica* and *Aremonia agrimonioides*. H. C. Watson rightly set his face against such assertions; but it is now pretty generally admitted that he went too far in the other direction, and decided against sundry plants which are hardly open to suspicion. In some cases it is almost impossible to arrive at certainty, and "not proven" will be the soundest verdict.

One great difficulty hinges on the use of the expression "waste places." Mr. Dunn has, I believe, understood this in an unusually restricted sense; most of us would probably include under it not

* The reference is to the number prefixed to each species in the Revision.

only village greens, rubbish-heaps, and other unoccupied land near towns and villages, but also sandy commons, sea-shores, &c.

The publication of Nyman's *Conspectus* has greatly helped towards forming a fairly accurate judgment about geographical affinities. Thus, if the European distribution of a given species is seen to be mainly eastern, the *primâ facie* inference will be against its inclusion as a British native. But this has to be corrected and modified by the known occurrence of a good many "outliers"; on which point Mr. Riddelsdell has rightly laid great stress.

I think that Mr. Dunn, relying upon herbarium-data and books, has sometimes too hastily assumed that species are native only in some distant countries, although frequent in the neighbouring parts of Europe; indeed his general tone strikes me as being a little too "academic."

The knowledge of each observer must of course depend mainly upon the districts which he has been able to examine personally in some detail; in other respects his judgment may be guided and improved by reading and museum work, but can hardly be decisive. For instance, I may (and do) accept *Iris spuria* as probably indigenous in Lincolnshire, on geographical and other grounds; but, never having botanized in that county, I must admit that such acceptance is merely inferential, and may be quite erroneous.

Aconitum Napellus L. I have practically no doubt from personal knowledge that this is native in Somerset, Monmouth, and Glamorgan; and it is endorsed by competent observers in some other western counties. If it be generally of garden origin, how can its absence as a well-established plant eastwards be accounted for? In two stations known to me it grows with the snowdrop under perfectly natural conditions.

Pæonia corallina Retz. Taking into account the neighbourhood of southern "outliers" on the same geological formation, such as *Helianthemum polifolium* and *Kæleria vallesiana* on Brean Down, and *Draba aizoides* in the Gower Peninsula, the case against its wildness on the Steep Holm is not, to my mind, by any means overwhelming.

Fumaria Boræi Jord. often looks indigenous in Cornwall, Devon, and Somerset. *F. capreolata* L. also occurs on coast cliffs and sands in the south-west; and I suspect that all our *Capreolatae* may be locally true natives, though mere weeds of agriculture over most parts of Britain. The *Officinales*, on the contrary, appear to be as clearly colonists as the poppies.

Brassica Sinapistrum Boiss. I have seen this not uncommonly by stream-sides and on the coast in Kent; and was led to consider it as an aboriginal species which had spread into cultivated ground, most likely reinforced by foreign seed.

Erysimum cheiranthoides L. "Wild in the Fen country" (Babington). I have found this on the banks of the upper Wey, Surrey, and of the Rother, West Sussex, and judged it to be as little open to objection there as any other plant. Usually, of course, it is a weed of cultivation.

Lepidium Smithii Hooker. As certainly native with us as in

France or Spain; I have even met with it on the banks of remote Highland streams.

Sisymbrium Sophia L. This has every appearance of being truly wild on some of our coasts, and may be equally so inland in East Anglia.

Viola tricolor L. Common in the Scottish Highlands by rivers, on rough banks, &c.; often associated with *V. lutea* Huds., and equally above suspicion.

Cerastium arvense L. On chalk-downs in Kent, Wilts, &c., this occurs in the unbroken turf, well away from agriculture; which would seem to be also the case in West Ireland.

Silene conica L. Native inland in West Suffolk; doubtless also elsewhere in the eastern counties, where I have botanized but little.

S. italica Pers. The Kent coast plant which I had referred to this species turns out to be *S. dubia* Herbach. I consider it quite distinct from *S. nutans* of the same region.

Malva rotundifolia L. I am glad to find that Mr. Riddelsdell concurs in the opinion which I formed (after much deliberation) that this is indigenous near the sea, if not elsewhere. *M. sylvestris* has, perhaps, still stronger claims to native rank, at least in the south.

Geranium pusillum L. By no means confined to "hedges and waste and cultivated ground." I have found it in rocky pastures in Somerset, and on cliffs remote from habitations in East Ross; and I believe it to be native in a good many of its stations. *G. pyrenaicum*, again, is not "only known on hedge-banks and field-borders." Rev. R. P. Murray (*Fl. Somerset*, p. 67) says: "It is almost impossible to resist the conclusion that this species is a true native in district 10." But I am not fully convinced of its title to rank as such.

Coronilla varia L. The acceptance of this by Mr. Dunn as a true native in Kent is surprising. Of course it may quite possibly be so, but the species is handsome enough to be planted for ornament, and has several times occurred as an alien. It was treated as an introduction in *Fl. Kent*, and I think rightly (see *Fl. Somerset*, p. 94, for a parallel case).

Medicago minima L. Certainly native on the coast from East Sussex to Norfolk, as well as inland in West Suffolk, and probably elsewhere.

Trifolium stellatum L. Twenty years ago this grew in good quantity at Shoreham, and most likely it is still to be found there (Mr. Dunn writes of it in the past tense). A rare instance of a ballast-alien becoming permanent.

Vicia lutea L. On bushy cliffs (South Devon!), as well as shingly sea-shores; inland in Dorset (Murray). Quite above suspicion.

Prunus insititia L. I think that this is more than a naturalized species, being so well and evenly distributed, at least over the southern counties. But here is one of those cases where certainty seems unattainable.

Ribes rubrum L., *R. nigrum* L., *R. Grossularia* L. These are all accepted by Mr. Dunn as true members of our Flora. Of late years I have been more and more inclined to admit the black currant (rejected by Watson); the gooseberry I have only seen genuinely wild in Yorkshire, and it seems to be bird-sown everywhere but in that and some neighbouring counties.

Cotyledon Umbilicus L. "A species abundantly naturalized on walls and in hedge-banks in the west of Britain." Mr. Dunn, however, agrees that it is native on Dartmoor and elsewhere. This is a crucial case, which apparently demolishes the negative argument from walls and hedge-banks. About my present Somersetshire home the plant grows in all sorts of suitable situations, and is without the least doubt native in all. In Surrey it is very rare; but I believe that it survives there and elsewhere on banks and lane-sides, simply because the natural conditions no longer exist. And indeed it could not easily be introduced unless purposely planted as a curiosity.

Ægopodium Podagraria L. Some years ago Mr. Moyle Rogers told me that he had lately seen this in South-west Scotland (about Kilmalcolm, Ayrshire, I believe) looking quite above suspicion; and Mr. Riddelsdell apparently thinks it so in South Wales. Such careful observers are likely to be right; my own experience would, however, have led to a different conclusion.

Anthriscus vulgaris Bernh. A not uncommon maritime and sub-maritime species with us, which Mr. Dunn considers to be native only in Croatia. I am convinced that it is equally so on our shores, and believe it to be truly wild in several inland counties.

Carum segetum L. "There seems no reason why it should not grow on bushy hillsides." But it sometimes *does*. I have even seen it in one or two Kentish copses, though as a rule it prefers more open situations. Excluded in the *Alien Flora*; but certainly aboriginal in several counties, and so plentiful in at least one that no detailed localities were given in *Fl. Kent*.

Smyrniolum Olusatrum L. This, again, I believe to be almost as surely native on our south coast cliffs, as it is introduced in all the inland stations. If it were rejected, we could not reasonably uphold as really wild *Brassica oleracea* and some other generally accepted species.

Sherardia arvensis L. Plentiful on limestone hills, chalk downs, sand-hills, &c. "No clearly native locality can be found in European Floras." This is, evidently, a sin of omission; the plant is wild enough.

Arnoseris pusilla Gaertn. I have observed this very local species about rabbit-burrows in the parish of Tilford, Surrey, as well as on newly-broken ground away from fields; but it is, upon the whole, best left as a colonist.

Artemisia Absinthium L. Mr. Fryer has (I think) confidently claimed this as a native of the fen district, East Anglia; and several of Mr. Murray's Somerset stations appear to be quite satisfactory. Mr. Dunn's admission of *A. vulgaris* L., only on the strength of my having found it on the coast of West Sutherland, is curious;

for it also grows on our southern shores, and its status does not seem to have been previously called in question, though it is predominantly a roadside and hedgerow plant.

Aster Linosyris Bernh. Is this known anywhere in Britain except as a native of maritime mountain-limestone cliffs? In Switzerland it accompanies *Cotoneaster integerrimus*, as is (or was) the case at Great Orme's Head.

Chrysanthemum Parthenium Pers. I had never seen the feverfew looking otherwise than an evident alien until last year. In West Somerset, however, it grows in profusion over a large area, often at a good distance from houses; and, although the probabilities point to its being merely a denizen here, I am not quite sure about it.

Crepis foetida L. Gathered by Mr. Murray and myself abundantly on the coast of Charente-Inférieure, West France, in 1884. I see no reason to distrust its wildness, either there or in Kent.

Doronicum Pardalianches L., *D. plantagineum* L. The available evidence is decidedly against including these as natives, though the *Alien Flora* does so. Both are treated as introduced in *Fl. Perthshire*. Neither reaches Scandinavia. I have occasionally met with the former in Scotland quite established, but under most suspicious circumstances.

Inula britannica L. "If, as seems possible, the seeds were introduced by migratory waterfowl, the species may be regarded as a native." Its only British station (Cropstone Reservoir, near Leicester) is doubtless itself artificial; and one hardly knows how to rank a plant found growing under such exceptional circumstances. Mr. Colgan in *Fl. Dublin* has treated some aquatics found in the Royal Canal as natives; others he queries as aliens (probably migrants from the central lakes).

Lactuca Scariola L. "It seems certain that it cannot be claimed as a native of this country." I have never collected this in Britain; but it has been so considered by competent observers, and some at least of its stations in Kent and Essex appear to be natural—*e.g.*, Plumstead Marshes.

Matricaria inodora L. The vars. *salina* Bab. and *phæocephala* Rupr. are beyond all doubt indigenous on our coasts.

Onopordon Acanthium L. Syme considered this truly wild in England, and I believe it to be so, at least on the south coast; inland it is more uncertain.

Sonchus arvensis L. In marsh-lands and on sea-shores this is surely open to no suspicion; so I cannot at all agree that "it is very doubtful whether the type of this species has ever been found in natural habitats." I suspect that *S. asper* and *S. oleraceus* are also native, but have not specially studied their distribution.

Anchusa sempervirens L. On the strength of its western distribution (Portugal to England), Mr. Dunn admits this to our Flora. In the south-west it is locally abundant; but I regard it as an extremely doubtful native.

Hyoscyamus niger L. Unquestionably indigenous in woods, &c., on the chalk in Kent and Surrey.

Solanum nigrum L. Truly wild, I believe, on many parts of the coast, though only a weed elsewhere.

Veronica arvensis L. "Native of the Mediterranean area, and exceedingly common in some parts of that region. Abundant in Britain as a weed of cultivated and waste places." This by no means meets the case. The plant is extremely plentiful on coast sands and grassy cliffs from Cornwall and Kent to Caithness, as well as on sandy commons, &c. *Bellis perennis* is not more certainly native.

Ajuga Chamæpitys Schreb. "It is nowhere known under natural conditions." In the chalk districts of Kent it sometimes grows on rough uncultivated hillsides, and has at least every appearance of being spontaneous.

Mentha sylvestris L. "Always suspected as a relic of cultivation in England." To this I must emphatically demur; in Kent, at least, it seems to be quite satisfactory as a wild species, and I consider its claims to rank as such much stronger than those of *M. alopecuroides* and *M. piperita*—both accepted by Mr. Dunn—though he may be right as to these.

Atriplex patula L. Not confined as a native to our coasts; it is equally so by slow streams in Surrey.

Chenopodium album L. "Has not been recorded, as far as the writer can trace, in any country in natural habitats." The Thames marshes below Woolwich seem to be such; and I believe it to be not uncommon in suitable spots near the sea and tidal rivers. In the case of such an ubiquitous annual it is, I think, better to admit than to question its genuine rank. *C. Bonus-Henricus* is rightly classed as an alien.

C. glaucum L. Lloyd (*Fl. de l'Ouest*) gives among its stations "sables, bords des rivières," which seems good enough. With us it is usually a rare farmyard or rubbish-heap plant; but an exception is known to me. In 1902 Mr. Ferguson Shepherd sent me fresh specimens from swampy ground on Chobham Common, Surrey, where a small state grew in profusion along with *Gentiana Pneumonanthe*, *Plantago major* var. *intermedia*, &c. On the strength of this I submit that it may reasonably rank as a native of England. *C. murale* L. I have only gathered in maritime localities, where I saw no ground for distrusting it. *C. Vulvaria* L. is likewise aboriginal on shingly beaches in Kent and Norfolk.

Rumex pulcher L. Native on the south coast and near the tidal Thames.

Parietaria officinalis L. This does not deserve to be classed among introductions. It is, as Mr. Riddelsdell has pointed out, thoroughly at home on rocks and cliffs, from which it would seem to have spread to old walls in most parts of our islands.

Urtica urens L. Frequent on sandy wastes, rabbit-warrens, &c., especially near the sea, and apparently indigenous there.

Populus alba L., *P. nigra* L. I believe that no careful observer would include these as likely natives; they do not seem, indeed, to be fully naturalized.

Pinus sylvestris L. "Whether any of the Scotch pines growing

now are descended from the wild stock must always remain doubtful." Not so, to anyone who is familiar with the Highlands. I have been told that the forests were mainly destroyed by fire in the course of tribal or clan fights; and the burnt ends of many trunks and roots still standing in the bogs confirm this theory. In any case there are plenty of native trees left in Scotland.

Sisyrinchium angustifolium Miller. Clearly indigenous in Ireland. Several new stations have been detected recently, some of them quite out of the beaten track.

Galanthus nivalis L. More often truly wild than has been supposed, especially westwards. It is clearly native in Monmouthshire; and I should so class it in two Somerset stations known to me, as well as one in West Sussex.

Leucojum æstivum L. By the Thames and some of its tributaries, and probably elsewhere in the South of England, this is indigenous. It has lately been found abundantly in West Ireland, growing under quite satisfactory conditions.

Arum italicum L. The cultivated form is different from that of our southern coasts, which is identical with the plant of West France.

Apera interrupta Beauv. I possess specimens from Culford Heath, Suffolk; and one or two of its other stations would seem to be uncultivated ground. The part of East Anglia where it occurs produces some species not found elsewhere in Britain; and, if it were a colonist, one would have expected a much wider distribution, as in the case of *A. Spica-venti*. But I have no first-hand knowledge about it.

Gastridium australe Beauv. My first acquaintance with this grass was as a plant of wood-borders in North Somerset. It may be really native in a few spots, though usually a corn-field weed.

Several other debatable points are purposely left untouched; as it is, this paper has outgrown my intended limits, and can only be justified by the fact that I have long paid attention to such questions. Mr. Dunn's book should be bought and studied.

BIBLIOGRAPHICAL NOTES.

XXXVIII.—JOHN BARTRAM'S TRAVELS.

THE copy of John Bartram's *Observations* (1751) in the library attached to the National Herbarium belonged to Peter Collinson, and contains numerous corrections in his hand, as well as a prefatory note giving the history of the work. The preface—which Collinson notes as "by Mr. Jackson of y^e Temple"—states that the journal "was by several accidents prevented from arriving in England till June, 1750, and is now made publick without the author's knowledge, at the instance of several gentlemen, who were more in number than could conveniently peruse the manuscript. . . . The friend to whom he sent it thought himself not at liberty

to make any material alteration," although, as is evident from Bartram's numerous notes in the National Herbarium, he certainly corrected Bartram's quaint and very original orthography.

Collinson's MS. note runs:—

"John Bartram, a Native of Pensilvania, lived on a small Patrimony on the River Skulkil [Schuylkill] abt 5 miles fr. Philadelphia. I employ'd him to collect seeds—100 Species in a Box at five Guineas each, from the year 1735 to this year 1760 about twenty boxes a year one with another which I have, to oblige the Curious in Planting, distributed amongst the Nobility & Gentry, &c.

"To Entertain Mee, he writt this Journal. I gave it to Whiston and Com. to Print who have done it scandalously.

" Peter Collinson."

We have a MS. "Account of the first Introduction of American Seeds into Great Britain" by Collinson, which may some day be worth printing; in it he says, "Besides myself, the next Person that gave J. Bartram encouragement was Lord Petre, at Thorndon, Essex, who continued to employ him from 1736 to 1740, then his Orders increased from the Dukes of Richmond, Norfolk and Bedford."

The delightful correspondence between Collinson and Bartram occupies the greater part of *Memorials of John Bartram and Humphry Marshall*, by William Darlington, M.D., published at Philadelphia in 1849.

It may perhaps be worth while to correct the statement in the *Catalogue of Books, &c., in the British Museum (Natural History)* that "the original MS." of William Bartram's Travels "is preserved in the Botanical Department." The MS. account of his travels which we have is not the original of the published work.

JAMES BRITTEN.

SHORT NOTES.

VITIS CHINENSIS Mill. Dict. ed. 8 (1768), No. 5.—This name, not cited in the *Index Floræ Sinensis*, is, as Miller's specimens in the National Herbarium show, and as Robert Brown noted on the sheet on which they are fastened, identical with *V. incisa* Lam. (Encyclop. ii. 612 (1786)), which it of course antedates. In the *Index Kewensis* both are referred to *V. Negundo*, but the Chinese Flora keeps them distinct. Specimens from Chelsea Garden show that it was cultivated there as *V. Negundo* in 1759 and 1781. Miller, whose description is good, says that it had been "lately introduced into the English gardens from Paris, where the plants were raised from seeds which were sent from China by the missionaries. I was favoured with some young plants by Monsieur Richard, gardener to the King at Versailles." The plant is well figured in Miller's

Figures of Plants, t. 275 (1758), as stated by Lamarck (*l. c.*), who however unnecessarily complicates matters by saying that it is "fort difficile de décider quelle est la plante que Linné a voulu désigner par son *Vitex negundo*, car il y cite les deux figures de Miller que nous indiquons ici," &c. These figures are not cited by Linnæus in either the first or the second edition of the *Species Plantarum*, and there seems no ground for supposing that he knew anything of the Chinese plant. Lamarck says that in his time *V. incisa* was cultivated in the Royal Gardens in Paris under the name of *V. negundo*.—JAMES BRITTEN.

PLANT RECORDS.—Some years ago I gathered near Aberdare, but in Breconshire, a grass which I took to be *Sesleria*; and Mr. Ley agrees, now that he has seen the specimen, that it can be nothing else. Besides seven vice-counties of North England and three of Scotland, the plant has been recorded, apparently on poor authority, also from Cornwall and Salop.—*Liparis Loeselii* Rich. When I wrote my note for *Journ. Bot.* 1905 (p. 274), I quite forgot that some years ago the Principal of St. David's College, Lampeter, told me that this orchid had been found near Kidwely, in Carmarthen-shire. The record is undoubtedly correct.—H. J. RIDDELSDELL.

NARCISSUS ODORUS L. IN CORNWALL.—A record of the occurrence, in a perfectly naturalized state, in the westernmost county of this native of Spain, France, Italy, &c., will come as a surprise to British botanists. About the middle of March, 1903, Miss Spettigue, of Porthpean, sent me two or three flowers of a strange narcissus, which she reported as plentiful in a damp meadow. At the time I named it *N. incomparabilis* Miller, but Mr. Spencer H. Bickham sought expert opinion on fresh specimens which I had forwarded to him, and was able to correct the name to *N. odorus* L. About a fortnight after the arrival of Miss Spettigue's specimens I paid a visit to where they were gathered, and, although school-children had taken away most of the flowers, I saw several thousands of plants. The locality is a damp field about two miles south of St. Austell, by the Sticker road from London Apprentice. A deep ditch and the remains of an old hedge-bank occupy the lower portion of the field. Two-thirds of the field was dotted with the narcissus, but the greatest number of plants were growing in and near the ditch. I was told that most of the cottage-gardens near had been liberally stocked with bulbs taken from the field, and that during recent years thousands had been removed to two or three neighbouring estates. The owner of the field told me the narcissus had been there in plenty ever since he entered into possession, over thirty years ago. In Baker's *Handbook of Amaryllideæ*, *N. odorus* comes immediately after *N. incomparabilis*. Mr. Baker describes *N. odorus* in the following terms:—"Bulb 1-1½ in. diam. Leaves 3-4, narrow, linear, bright green, deeply channelled down the face, ¼ in. diam. Peduncle subterete, 1-1½ ft. long. Flowers 2-4, uniform bright yellow, fragrant; pedicels shorter than the spathe. Perianth-tube subcylindrical, greenish, ¾ in. long; segments obovate-oblong, cuneate in the lower half, spreading, not imbricated, 1-1¼ in. long;

corona obconic, the same colour as the segments, $\frac{1}{2}$ in. long, with a spreading throat $\frac{3}{4}$ in. diam., with 6 short crenate lobes. Style overtopping the anthers, reaching halfway up the corona." In Cornwall *N. odoratus* has more valid claims to be considered a naturalized subject than *N. incomparabilis*, *N. biflorus*, or *N. poeticus*.—FRED. HAMILTON DAVEY.

THE HORE COLLECTION OF CRYPTOGRAMS.—This collection has just been presented to the North Devon Athenæum at Barnstaple, by the sisters of the late Rev. W. S. Hore, M.A. It consists of beautifully preserved specimens of British and foreign ferns, mosses, seaweeds, &c., which are carefully laid on folio sheets bound in forty-four volumes; and there are four manuscript quarto volumes of index and notes referring to the specimens. For an account of Mr. Hore see *Journal of Botany*, 1882, p. 288.—W. P. HIERN.

CORRECTION.—We regret that in our article on Lakeland plants, in the May number of this Journal, we by an oversight recorded as new a few plants which were already published in Wats. Top. Bot. ed. ii. They are *Rubus plicatus*, *Epipactis atrorubens* (which, indeed, under the name of *E. latifolia*, was recorded in Sm. Eng. Fl. iv. 41 (1828)), *Melica nutans*, *Festuca silvatica*. We owe this correction to the Rev. E. F. Linton.—A. LEY; W. R. LINTON.

BOOK-NOTES, NEWS, &c.

WE note with regret the announcement of the death of Mrs. Brightwen, on May 5th, at the age of seventy-five. Mrs. Brightwen was a vice-president of the Selborne Society, and a warm supporter of its objects. Her first book, *Wild Nature won by Kindness*, appeared in 1890, and was followed by *Inmates of my House and Garden* (a description of some of her numerous pets), *Glimpses of Plant-Life*, *Rambles with Nature Students*, and, in 1904, *Quiet Hours with Nature*. Her books, written in a simple, easy style, often conveyed a good deal of scientific information, the accuracy of which she was careful to ensure. Those who knew her at home remember a delightful personality, deeply interested in all around her, always busy, so far as her health allowed, but always ready to help on any good work.

MR. J. ADAMS, of the Royal College of Science, Dublin, has issued a small guide to the principal families of flowering plants, according to the system adopted by Dr. Engler. It is arranged in the form of a clavis, and British families are distinguished by small capitals. The book is published, at one shilling, by Sealy, Bryers, and Walker, of Dublin.

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A. *Cloiselia carbonaria*.
B. *Steandriopsis Thompsoni*



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A. *Melittacanthus divaricatus*.
B. *Amphiestes glandulosa*.

ALABASTRA DIVERSA. — PART XIII.

BY SPENCER LE M. MOORE, B.Sc., F.L.S.

(PLATES 478, 480.)

SERTULUM MASCARENSE.

ACANTHACEÆ (continued from p. 154).

Mimulopsis Forsythii, sp. nov. Caule basi radicante sursum ascendente rariramoso ramulis sat gracilibus ascendentibus foliosis, foliis ad normam generis parvis longipetiolatis ovatis vel ovato-oblongis obtusis vel cuspidato-acuminatis basi rotundatis levissime cordatis margine crenulatis vel crenulato-dentatis membranaceis nervis minute puberulis exemptis fere glabris, cymis ad apicem ramulorum abbreviatis paucifloris fulvo-pubescentibus, bracteolis lineari-vel oblanceolatis obtusis quam calyx brevioribus, calycis fere glabri lobis lineari-lanceolatis obtusis inter se inæqualibus, corollæ parvæ tubo calyci subæquilongo a basi gradatim amplificato lobis inter se æqualibus, antherarum staminum anticorum loculo altero brevissime calcarato nec alteri multo dissimili, stigmatis lobo postico abbreviato haud tuberculato, ovulis quoque in loculo 4.

Hab. Madagascar, Ambohimombo Forest, Tanala; *Forsyth-Major*, 378.

Foliorum limbus modice 3.0–4.0 cm. long. (raro fere 7.0 cm.), 1.4–1.8 cm. lat. (raro adusque 3.0 cm.), exstant itaque folia minora adhuc juvenilia 1.0–2.0 × 0.5–1.0 cm. metientia; petioli solemniter 0.7–1.0 cm. long., graciles, pubescentes. Cymæ circa 3.0 × 3.0 cm.; pedicelli summum 1.3 cm. long. Bracteolæ modice 0.35–0.55 cm. long. Calycis lobi vix 1.0 cm. long., 0.1–0.2 cm. lat. Corollæ tubus 0.8 cm. long., ima basi 0.3 cm. faucibus 0.7 cm. diam.; lobi obovato-rotundati, retusi, 0.7 × 0.7 cm. Antherarum staminum anticorum loculi majores 0.35 cm. minores 0.32 cm. long. Ovarium ovoideum, 0.3 cm. long., 0.2 cm. lat. Stylus inferne puberulus, 1.2 cm. long.; stigmatis lobus alter 0.15 cm., alter 0.05 cm. long.

Easily distinguished among Madagascar species by the broad almost glabrous lobes of the calyx, together with the small corollas and the stamens.

Melittacanthus, *Justiciearum* genus novum. (Plate 480A.)

Calyx amplus, campanulatus, alte 5-partitus, lobis lanceolatis inter se æqualibus. Corollæ tubus sat longus, superne ampliatus; limbus 2-labiatus labio postico lato subgaleato bifido (æstivatione interiore?) lateribus reflexis antico 3-lobo lobo intermedio quam laterales latiore. Stamina 2, juxta medium tubum inserta; filamenta breviter exserta; antheræ 2-loculares, connectivo lato instructæ, locus alter altero paullo altius affixus ambo oblongi, basi mutici. Staminodia 0. Pollinis grana ambitu rotunda, aliquanto complanata, lamina circumferentiali instructa, 2-porosa (Gürtel-pollen). Discus breviter cupulatus. Stylus filiformis; stigma

capitato-bilobum; ovarii loculi 2-ovulati. Capsula oblonga, calyce inclusa, fere a basi 4-sperma. Semina compressa, 2 fertilia minute scrobiculata, 2 sterilia glabra, retinaculis brevibus fulta.—Suffrutex? ramosus, ramis maxime divaricatis. Folia membranacea, integra. Flores mediocres, in cymas terminales sessiles plurifloras aggregati. Bractæ bracteolæque parvi.

Melittacanthus divaricatus, sp. unica. Ramis subtetragonis puberulis ad nodos aliquantulum tumidis, foliis parvis lanceolatis obtusis sessilibus costis utrinque puberulis exemptis glabris in sicco fuscis, bracteis bracteolisque lanceolatis acuminatis margine piloso-ciliatis, calycis lobis superne coartatis apice acutis glabris, corolla glabra, ovario oblongo obtuso una cum stylo glabro.

Hab. Ankafana, Madagascar; *Deans Cowan*.

Folia modice 2.0–3.0 cm. long., 0.7–1.3 cm. lat. Bractæ 0.6–0.8 cm. long.; bracteolæ circa 0.5 cm. long., et pedicelli circa 0.15 cm. Calyx 0.5–0.6 cm. diam.; tubus 0.2 cm. long.; lobi 1.0 × 0.2–0.25 cm. Corollæ tubus circa 2.0 cm. long., inferne 0.2 cm. superne 0.6–0.7 cm. diam. Antheræ 0.3 cm. long., apice minutissime apiculatæ. Ovarium vix 0.1 cm., stylus fere 2.5 cm. long. Capsula 0.7 cm. long., apice subito acutata, leviter polita; semina vix 0.2 cm. long.

The position of this genus is in the neighbourhood of *Isoglossa*. It appears to come nearest *Populina* Baill., known to me only by description. But this has racemose inflorescences, a differently shaped corolla, style obtuse at the apex, and an orbicular bract subtending every pair of flowers. Moreover, the pollen, as figured by Lindau (Bot. Jahrb. xvii. t. ii. f. 92), is essentially different.

CAMAROTEA Scott Elliot in Journ. Linn. Soc. (Bot.) xxix. 37. Mr. Scott Elliot refers this genus to the tribe *Ruellieæ*, a reference accepted by Dr. Lindau (Engler & Prantl, Pflanzenfam. iv. 3b. 306), who, however, had no opportunity of examining a flower. Mr. Clarke has recorded his belief, after examination of a bud, that the æstivation is imbricate, a statement there seems no reason to doubt, seeing that the pollen, which I have recently been able to study, is of the kind called “Gürtelpollen,” the pollen characteristic of *Isoglossa* and neighbouring genera. It is to this part of the order, therefore, that *Camarotea* must be transferred.

Justicia (§ **NICOTEA**) **seslerioides**, sp. nov. Herba humilis fere a basi ramosa radice elongato fibrillas longissimas teneras gignante, ramis divaricatis sparsim foliosis gracilibus tetragonis bifariatim puberulis, foliis parvulis ovatis acutis basi rotundatis subcoriaceis glabris cystolithis linearibus ditissime indutis petiolis brevibus puberulis sæpissime fultis, spicis axillaribus terminalibusve brevipedunculatis quam folia longioribus secundis densifloris, bracteis bracteolisque inter se fere æqualibus oblanceolatis acutis cymbiformibus piloso-ciliatis, calycis lobis bracteolis subæquilongis lobo quinto (postico) lanceolato-oblongo reliquis angustissime lineari-lanceolatis omnibus breviter acuminatis necnon margine piloso-ciliatis, corollæ tubo quam limbus longiore ex calyce breviter eminente superne paullulum amplificato extus pubescente labio

postico quadrato-oblongo apice integro antici rotundati lobis brevibus obtusissimis, ovario ovoideo, stylo glabro, capsula parvula glabra.

Hab. Madagascar; *Vaughan Thompson*.

Planta summum 20·0 cm. alt. Rami 0·1–0·12 cm. diam., fusco-purpurascens; internodia 3·5–5·0 cm. long. Folia 0·6–1·3 cm. long., 0·4–1·3 cm. lat.; costæ secundariæ utrinque 3–4, fac. inf. magis eminentes; petioli 0·1–0·3 cm. long., vel etiam 0. Spicæ 1·5–2·0 cm. long., 0·4 cm. diam. Bracteæ 0·55 cm., bracteolæ 0·5 cm. long. Calycis lobi 0·45 cm. long., posticus 0·06 cm. reliqui 0·02–0·03 cm. lat., omnes ut bracteæ et bracteolæ rigidi necnon virides. Corollæ tubus 0·5 cm. long., inferne 0·1 cm. faucibus 0·15 cm. diam.; labium anticum 0·2 cm. long. et diam., hujus lobi 0·075 cm. long. Ovarium 0·075 cm., stylus 0·5 cm., capsula 0·4 cm. long.

Can be at once distinguished by the densely-flowered secund heads, and the narrow and sharp-pointed bracts and bracteoles.

The pollen is like that of *Nicoteba*, but I agree with Mr. Clarke in considering that proposed genus an unsatisfactory one.

Justicia (§ HARNIERA) **Forbesii**, sp. nov. Caule ascendente prolixo distanter folioso geniculato glabro, foliis lineari-lanceolatis obtusis basin versus in petiolum sat longum coartatis utrinque glabris in sicco olivaceo-brunneis, floribus parvis in cymulis brevissimis paucifloris axillaribus digestis, bracteolis minutis quam calyx multo brevioribus, calycis lobis lanceolatis longe acuminatis glabris, corollæ tubo calycem leviter superante recto labio postico subquadrato apice integro labii antici lobis abbreviatis lateralibus oblongis intermedio obovato, antherarum loculo inferiore quam superior manifeste majore, stylo obtusiusculo, capsula normali quam calyx paullo longiore glabra abnormali rotundata margine leviter cristata glabra.

Hab. Madagascar; *John Forbes*.

Herba saltem 40·0 cm. alt. Folia (absque petiolo 0·5–0·8 cm. long.) 1·5–2·0 × 0·5–0·7 cm.; floralia sessilia vel subsessilia, summum 1·0 cm. long. Bracteolæ lineares vel lineari-lanceolatae, 0·1–0·2 cm. long. Calyx 0·4 cm. long. Corollæ tubus 0·45 cm. long., sursum leviter amplificatus; labium posticum 0·4 × 0·3 cm.; labii antici lobi 0·125 cm. long. Antherarum locus alter 0·08 cm. alter (incluso calcare acuminato) 0·2 cm. long. Ovarium conoideum, disco conspicuo circumdatum; stylus puberulus, ægre 0·5 cm. long. Capsula normalis 0·6 cm. long., abnormalis 0·4 × 0·4 cm.

Nearest *J. Mollugo* C. B. Clarke, with which it agrees in the shortly cymulose inflorescences, but from which it differs, among other points, in the larger corollas and the normal capsules twice as long.

JUSTICIA DELICATULA Scott Elliot, *l. c.* 39. A species referred to § *Rostellularia* by Mr. Scott Elliot; its characters, however, seem to be entirely those of § *Ansellia*. At the Museum this species is represented by the following specimens:—Imerina; *Hildebrandt*, 3653. Ivohimánitra Forest; *Forsyth-Major*, 31.

Justicia (§ **ANSELLIA**) **tanalensis**, sp. nov. Canle debili deorsum radicante ramulis sæpe aliquanto tortuosis cito glabris, foliis parvulis distincte petiolatis oblongo-lanceolatis utrinque obtusis subcoriaceis glabris, spicis quam folia longioribus 3-8-floris, bracteis bracteolisque abbreviatis ovatis obtuse acutis margine ciliolatis, calycis glabri lobis lineari-lanceolatis acutis bracteolas pluries excedentibus, corollæ tubo calycem excedente superne leviter dilatato labio postico breviter bilobo antici lobo intermedio quam laterales fere duplo latiore, antheris subinclusis, capsula sursum angustata calycem duplo excedente glabra.

Hab. Ambohimitombo Forest, Tanala; *Forsyth-Major*, 414.

Foliorum limbus 1.3-2.0 cm. long., 0.3-0.6 cm. lat., cystolithis copiose indutus; costa media subtus prominens, costæ secundariæ utrinque 3, valde arcuatæ, sæpe parum perspicuæ; petioli graciles, 0.3-0.4 cm. long. Spicæ modice 2.0-3.5 cm. long. Bracteæ bracteolæque circa 0.1 cm. long. Calyx 0.4 cm. long. Corollæ tubus 0.6 cm. long., basi 0.15 cm. superne 0.25 cm. diam.; labium posticum ovato-oblongum, in toto 0.3 cm. long., lobi oblongi, obtusissimi, 0.12 cm. long.; labii antici lobi laterales 0.2×0.12 cm., lobe intermedius 0.22 cm. lat. Antherarum locus superior basi acutus 0.13 cm. long., loc. inferior calcaratus 0.15 cm. long. Ovarium glabrum, 0.1 cm., stylus puberulus, 0.4 cm. long. Capsula 0.75 cm. long.

Differs from *J. delicatula* Elliot in the differently shaped leaves of firmer consistence, the larger calyx and corolla, &c.

HYPOESTES ADSCENDENS Nees in DC. Prod. xi. 502, is a species hitherto supposed unrepresented in this country so far as the type is concerned. Some fragments from specimens in the British Museum, collected by Hilsenberg and Bojer, which seemed to answer Nees's description, were recently sent to M. Casimir de Candolle, with the request that he would compare them with the type in the De Candolle Herbarium at Geneva. This request was very kindly complied with, the result being that the specimens agree with the said type except in having 2-flowered involucre, while the type has them 1-flowered. The involucre which I examined, however, had but a single flower each, and the endeavour to find one with two flowers failed; it would appear, therefore, that M. de Candolle happened to open an abnormal involucre or involucre, which is less improbable when it is remembered how normally 1-flowered involucre often have a second small sterile flower, which might, one would imagine, occasionally grow up into a fertile one. I venture, therefore, to consider that in these specimens the Museum has the true *H. adscendens* Nees, and as they seem virtually identical with the plant subsequently described under the name of *H. calaminthoides* by Mr. Baker (Journ. Linn. Soc. (Bot.) xx. 222), the latter name must disappear.

Specimens of this at the Museum are *Baron*, 863 and 4153, and *Hildebrandt*, 3487, 4026.

The *H. adscendens* of Herb. Kew., quite a different plant, I regard as a new species, of which a description is given below.

H. TEUCRIOIDES Nees in DC. Prod. xi. 503. Here again, and still once more in the following case, I am indebted to the kindness of M. de Candolle in comparing a scrap with the type in his historical family herbarium. The Museum specimen was collected by Hilsenberg and Bojer, the accompanying label bearing the inscription "an ? *Justicia malabarica* Vahl. in prov. Emerina." There is, I believe, no specimen answering to this in the Kew Herbarium.

H. THOMSONIANA Nees in DC. Prod. xi. 502. A small scrap collected by Vaughan Thompson has all the characters noted by Nees in respect of his plant named as above, and M. de Candolle finds that it agrees perfectly with the type. Thompson undoubtedly collected both the Museum and the Geneva specimens, the latter having apparently been communicated to A. P. de Candolle.

Hypoestes Elliotii, sp. nov. Caule ascendente parum ramoso deorsum patule pubescente vel subhispido, ramis distanter foliosis minute pubescentibus puberulisve, foliis brevipetiolatis ovatis utrinque obtusis vel obtusissimis faciebus ambabus appresse puberulis membranaceis costis secundariis 3-4 quarum 2 prope petiolum costæ centrali insertis ascendenti-fornicatis, floribus mediocribus in cymis plurifloris axillaribus sessilibus digestis, involucris teretibus 1-floris 4-bracteolatis, bracteis obovatis vel obovato-oblongis puberulis, bracteolis lanceolatis sursum longe attenuatis patule glanduloso-pubescentibus interioribus quam exteriores paullo minoribus, calycis bracteolis duplo brevioris lobis lanceolatis acutis glabris, corollæ extus pubescentis tubo ex involucrio eminente dimidio superiore leviter dilatato labio postico ovato-oblongo obtuso antico late obovato adusque medium trilobo, staminibus exsertis filamentis pilosulo-puberulis, ovario ovoideo ut stylus aliquanto compressus glabro.—*H. adscendens*, *Hb. Kew. non Nees*.

Hab. Madagascar, Ankanatra Mountains; *Hildebrandt*, 3861. Arivonimamo; *Scott Elliot*, 1935.

Folia modice 1.5-2.0 × 1.0-1.7 cm. (excluso petiolo puberulo vel pubescente 0.3-0.5 cm. long.), in sicco supra fusca subtus pallidiora. Bracteæ ± 0.4 × 0.3 cm. Bracteolæ exteriores 0.8 cm., interiores 0.75 cm. long. Calyx 0.4 cm. long. Corollæ tubus 1.2 cm. long., inferne 0.2 cm. superne 0.3 cm. diam.; labium posticum 0.5 × 0.225 cm.; antici lobi obovati, obtusissimi, 0.3 cm. long. Filamentorum pars exserta 0.25 cm. long., antheræ 0.12 cm. Ovarium 0.15 cm., stylus vix 1.5 cm. long.

To be inserted next *H. teucroides* Nees, which has narrow bracts, shorter involucres with a shorter narrowed extremity, markedly smaller corollas, &c.

Hypoestes leptostegia, sp. nov. Spithamea vel ultra ramis ramulisque subteretibus griseo-pubescentibus puberulisve novellis albido-tomentosis, foliis parvulis brevipetiolatis ovatis obtusis vel obtuse acutis basi subrotundatis utrinque griseo-pubescentibus tandem puberulis floralibus iis similibus nisi minoribus ultimis equidem minutis, floribus in spicis tenuibus paniculatis pubescentibus digestis, involucris teretibus unifloris 4-bracteolatis, bracteolis

liberis inter se subæqualibus exterioribus anguste lineari-oblongis obtusis interioribus angustissime lineari-lanceolatis acuminatis omnibus margine membranaceis necnon ciliatis puberulis, calyce quam involucrium multo brevior ultra medium partito lobis subæqualibus lineari-lanceolatis acuminatis ciliatis, corollæ mediocris tubo involucrium æquante apice inflexo ibique levissime dilatato extus piloso-puberulo labio postico lineari-oblongo integro antico obovato breviter 3-lobato, staminibus labiis brevioribus, ovario anguste ovoideo glabro, stylo glabro, capsula —.

Hab. Fort Dauphin; *Cloisel*, 26.

Folia 1.0–1.5 cm. long., 0.5–0.8 cm. lat.; costa media fac. inf. eminens; costæ secundariæ paucæ (2–3), ascendentes, proxime marginem arcuatis; petioli 0.2–0.3 cm. long., griseo-pubescentes. Folia floralia $\pm 0.5 \times 0.35$ cm. Spicæ modice 2.0–6.0 cm. long. Bracteolæ exteriores 0.65–0.7 cm., interiores 0.6 cm. long., ille superne fuscescentes. Calyx in toto 0.3 cm., ejus tubus 0.1 cm. long. Corollæ tubus 0.7 cm. long., 0.1 cm. diam.; labium posticum 0.95×0.125 cm., labii antici vix 0.5 cm. lat. lobi 0.23 cm. long. Filamenta e tubo ad 0.65 cm. exserta; antheræ 0.12 cm. long. Ovarium 0.1 cm. long.

Apparently nearest *H. microphylla* Baker, which has longer lanceolate leaves, lanceolate bracteoles, corolla with limb only half as long as tube, a cuneate lower lip, &c.

The involucre has been described as 1-flowered, but the very small rudiment of a second flower (only 0.08 cm. in length) is to be seen in some cases. Possibly this may sometimes develop into a perfect flower.

Hypoestes betsiliensis, sp. nov. Caule erecto ramoso cortice albido obducto, ramis tetragonis subdistantibus foliosis erectis microscopice puberulis, foliis breviter petiolatis lanceolatis sursum plerumque leviter cuspidulatis apice basique obtusis glabris, floribus in spicis brevibus simplicibus vel subsimplicibus vel in panicula crebro ramosa dispositis, bracteis foliis similibus sed minoribus, involucriis teretibus 1-floris 4-bracteolatis, bracteolis anguste ovato-oblongis obtusis puberulis exterioribus quam interiores paullulum majoribus infra medium connatis, calyce involucrio brevior paullo ultra medium partito lobis lanceolatis acuminatis ciliolatis, corollæ tubo involucrium longe superante superne dilatato basin versus minute pubescente alibi puberulo labio postico anguste oblongo-obovato obtuso antici lobis brevibus obtusissimis, staminibus e tubo corollæ breviter exsertis, ovario oblongo glabro, stylo puberulo.

Hab. Betsileo, Madagascar; *Hildebrandt*, 3905.

Folia modica 3.5–5.0 cm. long., 1.3–2.0 (raro 2.5) cm. lat.; costæ secundariæ utrinque 5, late fornicatæ. Bracteæ gradatim imminutæ, tandem circa 0.5 cm. long. Bracteolæ exteriores 0.6 cm., interiores 0.55 cm. long. Calyx 0.3 cm. long. Corollæ tubus 1.3 cm. long., juxta basin 0.1 cm. faucibus 0.45 cm. diam.; limbi labia circa 1.0 cm. long. Ovarium 0.2 cm., stylus 1.35 cm. long.

Near *H. saxicola* Nees, but easily distinguishable from it by the smaller differently shaped involucre.

Amphiestes, *Justiciearum* genus novum. (Plate 480B.)

Calyx hyalinus, bilabiatus, labio antico bifido binervoso, postico tridentato trinervoso, labiis duobus basi connatis. Corollæ tubus superne gradatim dilatatus, rectus; limbus bilabiatus, labio postico erecto integro, antico ampliore tridentato. Stamina 2, faucibus inserta, breviter exserta; antheræ 1-loculares, muticæ. Staminodia 0. Pollinis grana iis *Hypoestis* et *Periestis* similia (*Spangpollen*). Discus capularis. Stylus filiformis, apice bilobus; ovula quoque in loculo 2. Capsula ovoideo-oblonga, a basi 4-sperma, placentis a valvis haud solvendis. Semina fere levia, retinaculis complanatis truncatis fulta.—Verisimiliter suffrutex parvus. Folia ampla, integerrima. Flores in panicula terminali laxa ramosa dispositi, sessiles vel ramulos breves coronantes. Bracteæ parvæ. Bracteolæ 4, per paria decussata insertæ, involucrum teres constituentes, interiores cum calycis labiis alternantes.

Amphiestes glandulosa, sp. unica. Caule erecto folioso glanduloso-pubescente, foliis ellipticis acutis vel obtusis basin versus in petiolum angustatis tenuiter membranaceis piloso-puberulis, paniculis foliis longioribus distanter plurifloris glanduloso-pubescentibus, bracteis vetustioribus lanceolatis junioribus linearibus omnibus glanduloso-pubescentibus, involucris 1-floris, bracteolis exterioribus basin versus connatis elongatis ovato-oblongis sursum longiuscule caudatis glanduloso-pubescentibus interioribus linearilanceolatis acuminatis quam exteriores manifeste brevioribus extus sursum puberulis, calycis quam bracteolæ interiores minoris labiis linearilanceolatis microscopice ciliolatis, corollæ extus piloso-pubescentis tubo bracteolis exterioribus longioribus labio postico lanceolato antico ovato, filamentis crassiusculis piloso-puberulis, ovario a disco amplo magna pro parte oblecto ovoideo-oblongo glabro, stylo glabro.

Hab. North Madagascar; *Baron* 6678.

Stirps saltem 35 cm. alt. Internodia circa 6.0–8.0 cm. long. Foliorum limbus 9.0–12.0 × 0.4–0.5 cm., exstant vero folia pauca juniora minora; costæ secundariæ utrinque 8, latissime arcuatæ; petioli 0.5–2.5 cm. long., pubescentes. Panicula 15.0 × 10.0 cm., glanduloso-pubescentis. Bracteæ modice 0.2–0.7 cm., bracteolæ ext. 1.3–1.5 cm., int. 1.0 cm. long. Calyx 0.6–0.7 cm. long.; labii antiqui lobi 0.15 cm. long., postici dentes laterales 0.03 cm., intermedius 0.05 cm. long. Corollæ tubus circa 2.0 cm., labium posticum 0.75 cm., antiqui lobi modo 0.1 cm. long. Filamentorum pars exserta 0.4 cm., antheræ 0.3 cm. long. Discus 0.12 cm. alt., leviter undulatus. Ovarium 0.15 cm., stylus 2.0 cm. long. Capsula 0.75 cm., semina circa 0.2 cm. long., hæc in sicco brunnea.

A singular plant, which I feel justified in referring to a genus hitherto undescribed. Its affinity is, of course, with *Hypoestes*, for a species of which it would naturally be taken before the flower was examined. The peculiar feature is the bilobed calyx, bilobing due not to mere unequal coalescence of the lobes of an otherwise actinomorphic calyx, but, as will be seen by a glance at figs. *g–i* of Plate 480B, to a fundamental difference in structure. The calyx,

in fact, resembles in every way a third pair of bracteoles, and such I considered it until the absence of a floral whorl between it and the corolla, and then the lobing and toothing came into view. This organ yields a fact of much interest to the morphologist, seeing that by a sort of "correlation of growth" it repeats, as regards both form and orientation, the organs immediately preceding it in the order of development.

CROSSANDRA BOIVINI. Since writing the above, a specimen has come under my notice which I unhesitatingly refer to *Crossandra Boivini* (*vide ante*, p. 152). It is an old one of Vaughan Thompson's with a flower and several capsules. This discovery entails a slight modification of, and addition to, the description. Thus the leaves reach 6 cm. in length and 2.5 cm. in breadth, while the longest petioles are 3 cm. long. The spike is 2 cm. long. The capsule, shortly acuminate and pilose-pubescent at the top, has a length of 0.8 cm. The seeds are subquadrate, closely tubercled, a rich yellow-brown in colour, and measure about 0.2 cm. across.

DESCRIPTION OF PLATES 478 AND 480.

(All figures more or less magnified unless noted otherwise.)

PLATE 478. A. *Cloiselia carbonaria*.—View of dry plant, nat. size: *a*, A corolla moistened, nat. size. *b*, Upper part of an opened floret, showing the bilabiate limb. *c*, Two of the anthers, showing the long tails united in pairs. *d*, Style-arms. *e*, Achene and pappus, nat. size.

B. *Stenandriopsis Thompsoni*.—View of upper part of a plant, nat. size: *f*, Calyx, &c., showing *b*¹, the bract, and *b*², the bracteoles. *g*, Corolla opened. *h*, An anther. *i*, Pollen-grain in two positions. *k*, Ovary with one cell opened. *l*, Upper part of style with stigma. *m*, Capsule, nat. size. *n*, A seed.

PLATE 480. A. *Melittacanthus divaricatus*.—Small portion of plant, nat. size: *a*, Calyx with bract (*b*¹) and bracteoles (*b*²). *b*, One of the two anthers showing subequal cells separated by a broad connective. *c*, Pollen-grain in profile and semi-profile positions. *d*, Ovary with one cell opened longitudinally. *e*, Style and stigma.

B. *Amphiestes glandulosa*.—View of small piece of plant, nat. size: *f*, An involucre showing bract (*b*¹), outer (*b*²) and inner bracteoles (*b*³). *g*, Calyx. *h*, Lower lip of same more highly magnified and; *i*, the upper lip. *k*, Corolla, nat. size. *l*, A stamen. *m*, Pollen-grain. *n*, Disk opened longitudinally to show the ovary, one of the cells of which is open to expose the two ovules. *o*, Upper part of style.

CAREX NOTES.

By C. E. SALMON, F.L.S.

I RECENTLY sent a small parcel of Carices to the Pfarrer Küken-thal for determination. Two or three plants bear names unfamiliar to the British botanist, so I have ventured to print the more interesting results of his examination.

Where possible I have added the original descriptions of the varieties quoted, and a few supplementary notes, in which Mr. A. Bennett, Mr. C. B. Clarke, and the Rev. E. S. Marshall have kindly assisted me.

C. stricta var. *homalocarpa* and *C. riparia* var. *humilis* do not seem to have been recorded as British before.

I am responsible for all gatherings where no collector's name is given.

CAREX INTERMEDIA Good. forma *MINOR* Peterm. Bucks: ditch near Weston Turville Reservoir, 1904. Combe Wood, Warwickshire, *J. E. Bagnall*, 1881.

A puzzling plant, when young, reminding one of *arenaria* f. *remota*, or *paniculata* f. *simplicior*—indeed, the Coombe Wood example had been given this latter name by two well-known British botanists. Its elongated, more slender, spikes, with spikelets interrupted at base, seem to distinguish this form.

C. ARENARIA L. forma *REMOTA* Marsson. Surrey: bank near Hankley Common, 1892. Lincoln: near Tringmoor Gulleries, Brigg, *C. Waterfall*, 1897.

Described as follows:—"β *remota*. Caule elato gracile apice nutante; spiculis inferioribus 2-3 remotis; folio involucrali plerumque longissimo."—*Marsson*, Fl. von Neu-Vorpommern, 553 (1869).

Distinguishable at a glance when extreme, but no doubt shades off into the type.

C. PANICULATA L. forma *SIMPLICIOR* Anderss. Surrey: west of Reigate Heath, 1896, and pond near Warren Lodge, Witley Common, 1902. Luffness, E. Lothian, *F. C. Crawford*, 1899.

"Spica angusta, spiculis parum decompositis, pedunculis arrectis."—*Andersson*, Pl. Scandin. 67 (1849).

Is a not uncommon form, and often found with the type. When extreme* may be taken for *C. Bænninghausiana*, from which it may be distinguished by its short setaceous lowest bract and long beaked perigynia.

C. LEPORINA L. forma *ARGYROGLOCHIN* Hornem. Berks: side of Bulmershe Park, near Earley, 1893.

Described as a species in Fl. Danica, t. 1710 (1821). Its chief distinction lies in its "glumæ pallidæ," i. e. silvery white, which make it a very pretty plant.

Syn. *C. leporina* L. β *argyroglochin* Lang in *Linnæa*, xxiv. 532 (1851).

C. STRICTA Good. var. *HOMALOCARPA* Aschers. & Graebn. Mitteleurop. Fl. ii. 2, 84 (1902). Norfolk E.: Wroxham, 1902.

Described as a species by Petermann in *Flora*, 1844, 333:—"Spicæ masculæ 2-1, cylindricæ, elongatæ, femineæ 2-3, erectæ, cylindricæ, elongatæ, sessiles, apice sæpe masculæ; bractæ foliaceæ, basi biauriculatæ, evaginatæ; stigmata 2; stegocarpia elliptica, glabra, plana, obsolete nervosa, brevissime rostrata, rostro terete indiviso; culmi superne scabri, flaccidi; folia flaccida; foliorum vaginæ inferiores reticulato-fissæ; radix densissime cæspitosa."

"Differs from *stricta* by its flaccid bending culms inclining out-

* (This is evidently the var. *pseudo-Bænninghausiana* Watson, mentioned in Fl. Berks, 535.)

wards, and the flaccid dark grass-green leaves; in *stricta* the culms and leaves are stiffly upright, and the latter grey-green."

C. STRICTA (*Hudsonii*) × ? *GOODENOWII*. Shropshire: Marton Pool, *R. de G. Benson*.

"I am not able to call this true *C. stricta* on account of narrow spikelets, and also utricles (sterile) few-veined, but the other parent I do not know."—*G. K.*

"Too slender for *C. Hudsonii*, I think. As it is so nearly sterile it may be a hybrid, possibly of *C. Hudsonii* and *C. Goodenowii*."—*E. F. Linton*.

C. GRACILIS (*acuta*) × *STRICTA*. Norfolk E.: Ranworth, 1902.

C. GOODENOWII Gay b. *RECTA* Aschers. & Graebn. *l. c.* 95. Sussex W.: Midhurst Common, 1902. Sutherland W.: by the Loanan River, Inchnadamph, 1899.

Originally described as follows by Fleischer, Riedgr. Württemb. 16 (1832):—" *C. cæspitosa* L. β *recta*. Not cæspitose, leaf-tufts and haulms proceed singly from the creeping root. Haulms stiffly erect, slender, 1-1½ ft. Leaves as long as the haulms, very narrow, upright. Male spikelets as in the preceding [single, or with a second smaller one at the apex]; female spikelets, however, more slender, distant, longer, almost as long as the male. Glumes bristle-like, very long."

Evidently near *juncella*, which these plants had been named by English botanists.

C. GOODENOWII × *STRICTA* (= *turfosa* Fries). Westerness: by Callop River, just where it enters Loch Shiel, 1902.

Gathered as a peculiar form of *Goodenowii*, having long fruit and very green spikes. Some will disagree with Prof. Kükenthal's opinion as to *turfosa* Fries being the hybrid named.

C. stricta is not on certain record for any county further north than Aberdeen (Journ. Bot. 1888, 154).

C. AQUATILIS Wahl. forma *ANGUSTIFOLIA* Kük. Forfar: Upper Valley of White Water, Clova, *A. Somerville*, 1896.

A most variable species in Scotland; it seems unwise to name *individuals* in this way.

C. CEDERI Retz. Somerset S.: near Weir Water, near Porlock, 1898.

C. CEDERI Retz. var. *ELATIOR* Anderss. Kent: Ham Ponds, *Mr. Sanders* (hb. *R. Pryor*). Sussex W.: Storrington, *T. Hilton*, 1900, and near Graffham, 1901. Cantire: roadside near Loch Errol, 1897. Cork: Inchigeela, *R. A. Phillips*, 1897.

"Culmo digitali-pedali, folia superante."—*Andersson*, Pl. Scand. 25 (1849).

Evidently quite a frequent state, and should be regarded probably merely as a tall form rather than a good variety.

C. CEDERI Retz. var. *ÆDOCARPA* Anderss. Sussex E.: Copthorne Common, 1891.

Andersson's description in *Plantæ Scandin.* 25 (1849) reads:—"Spica masc. valde pedunculata, fem. ovatis-globosis remotis,

fructibus nervis acutioribus rostroque evidentiori, recto, bracteis erecto-patentibus; culmis decurvis.—(Nomen *tumidicarpa*, Bot. Not. 1849, p. 6 [16] ut vox hybrida, in *ædocarpam* mutandum)."

This is quite our commonest form of the "*flava*-group," and is the "*flava* var. *minor* Townsend." (See Journ. Bot. 1881, 163.)

Nearer to *Æderi* than to *flava* (segregate), or *lepidocarpa* Tausch., by its straight, not abruptly deflexed, beak, and its (usually) smaller perigynia. In some respects it is intermediate.

C. FLAVA × *ÆDERI*. Mid Perth: Creag Mhor, Glen Lochay, A. Somerville, 1889. Sussex E.: Copyhold, Cuckfield, Mrs. Davy, 1903, and near Colman's Hatch, Ashdown Forest, 1896.

The only *obviously* sterile spikes are those on the Cuckfield plants.

C. LEPIDOCARPA Tausch. Somerset N.: Max Bog, Winscombe, J. W. White, 1903. Kent: Keston Common, 1846 (hb. R. Pryor). See Rep. Bot. Exch. Club for 1892, 390.

A much more frequent plant in Scotland than in England.

C. RIPARIA Curt. var. *HUMILIS* Uechtr. Sussex W.: near Brew-hurst Mill, Loxwood, 1902.

First mentioned by Fiek, Fl. Schlesien. 492 (1881), as under:—"*C. riparia* Curt. γ *humilis* Uechtr. More dwarf (0.40–0.50 m.), smaller in all its parts; leaves shorter, only 3–6 mm. broad, strongly greyish green; female spikelets usually 2, more distant, 0.20–0.30 m. long, but densely flowered, cylindrical or ovate at the base, very shortly stalked or almost sessile. The smaller examples almost resemble in appearance *C. distans* L., the larger ones remind one of *C. nutans* Host." (U. in litt.).

Ascherson & Graebner (*l.c.* 216) say that this is a "*forma nana gracillima*," with imperfect fruits, which Christ notes in Bull. Soc. Bot. Belg. xxvii. 2, 163, may perhaps be a hybrid with *C. distans*.

A very neat little plant, with small spikes of a different outline to those of *riparia*, and the glumes and perigynia also differ, the former not so long as in type. Plant about 18 in. high. Hardly likely to be a hybrid with *distans* in this locality.

MYCETOZOA FROM JAPAN.

By ARTHUR LISTER, F.R.S., AND GULIELIMA LISTER, F.L.S.

IN January, 1906, the Botanical Department of the British Museum received forty-six specimens of Mycetozoa, consisting of twenty-nine species, presented by Mr. Kumagusu Minakata, who collected them during the years 1902 to 1905 in Kii, the southernmost province of Japan proper, in about latitude 34 deg. N.

The only other collection from that country which has come under our notice was sent by Prof. Miyoshi, of Tokio, in 1902, to Prof. Marshall Ward, and is now in the Cambridge Herbarium. It consists of specimens of eighteen species, noticed in this Journal for 1904 (p. 97). Of these, nine appear again in the following list, and are marked with a star. The total number of species of Myce-

tozoa hitherto recorded from Japan, to our knowledge, is therefore thirty-eight. They include none that are entirely new, and correspond in character with gatherings from the United States and the West Indies, though some are of rare occurrence and of great interest.

Ceratiomyxa mucida Schroet. "Found inside a hollow trunk," K.M. Mt. Nachi, Kii. May 9th, 1903. A white network of depressed sporophores, approaching the var. *porioides*. B.M. 1984.

C. mucida var. *porioides*. "Plasmodium white, on dead stumps." K.M. Temma, Kii, Aug. 5th, 1904; immature. B.M. 1983.

Badhamia hyalina Berk. var. *papaveracea*. On coniferous bark, Mukôyama, Nachi, Kii. April 18th, 1902. The sporangia are grey, 0.5 mm. diam., with pale ochraceous stalks 0.3 to 0.4 mm. long. The spores are dark purple-brown, warted on the outer third, closely compacted in small clusters of from five to ten. It is a small form with paler and more translucent stalks than we have seen before in this variety. B.M. 1985.

Physarum viride Pers. Four specimens; one immature; "plasmodium yellow," K.M. gathered Feb., 1903; three mature, gathered on fallen timber, Nachi, Aug., 1903. It is a very delicate form of the species; the sporangia are bright yellow, scarcely more than 0.2 mm. diam.; none are quite unbroken, and many have shed the spores; the stalks are slender, varying in length from 0.3 to 1 mm., and contain more or less lime and refuse matter in the lower two-thirds; the capillitium is very delicate, with fusiform yellow lime-knots; in some the knots are rounded, somewhat resembling those of *P. tenerum* Rex. B.M. 1986, 1987, 1988, 1989.

P. nutans Pers. var. *genuinum*. "On wooden side-work of a well," K.M. Tanabe, Kii. Summer, 1905; typical. B.M. 1990.

P. nucleatum Rex. "On dead oak-branches on earth," K.M. Ichinono, Kii. July 23rd, 1903. A very typical specimen; the central ball of lime is perhaps unusually large. B.M., 1991.

**P. compressum* A. & S. Tanabe, Kii. Aug. 23rd, 1905. This is a good specimen, and quite typical; the compressed sporangia are mostly reniform and curved, on dark stalks. B.M. 1992.

P. bivalve Pers. "On fallen trunks. K.M. Kuragaridani; Nachi. June 8th, 1904. The sinuous, wall-shaped sporangia, dehiscing along the ridge, have the usual appearance, except that the flat sides are nut-brown; the capillitium and spores are typical. B.M. 1993.

P. psittacinum var. *fulvum*, n. var. On dead wood. Ichinono, Kii. Aug. 24th, 1903. A beautiful form with the usual iridescent sporangia and orange-red lime-knots; the stalks, however, and the bases of the sporangium-walls are fulvous yellow instead of vermillion. We have received this variety once before from the State of New York, and from the striking colour of the stalks propose to distinguish it as var. *fulvum*. We have the usual red-stalked form from New York and Massachusetts. *P. psittacinum* is said by Prof. Macbride to be rare in the United States; it is fairly abundant in Europe, but, except for the Japanese gathering, we have no record of its occurrence in other parts of the Old World. B.M. 1994.

P. roseum B. & Br. "On old tub," K.M. Tanabe, Kii. Summer, 1905. A beautiful and perfectly typical specimen. B.M. 1995. Also on fallen trunks, Kuragaridani, Nachi, June 8th, 1904. B.M. 1998, *ex parte*.

P. melleum Mass. On fallen leaves. Ichinono, Kii. June 24th, 1904. This is the usual form with brownish yellow sporangia and white stalks. B.M. 1996.

Fuligo septica Gmel. Two specimens on dead stumps, quite typical, with yellow lime-knots; spores $7\ \mu$. Temma and Isaida. Summer of 1904-5. B.M. 1997, 1998.

**Diachæa elegans* Fr. On fallen branches. Kuragaridani, Nachi. June 8th, 1904. Typical. B.M. 1999.

Chondrioderma reticulatum Rost. "On living stems and leaves of *Lactuca denticulata*," K.M. Ichinono, Kii. July 18th, 1903. The very flat sporangia are thickly scattered over the leaves; the lime on the sporangium-walls has often become crystalline, as not infrequently happens; it has the usual very slender capillitium and spores $7\ \mu$. diam. B.M. 2000

**Didymium nigripes* Fr. var. *xanthopus*. There are three specimens of this species: one on old dry radish-roots, Nachi, July, 1903; one on bamboo sheaths, Ichinono, May, 1904; and one on the leaves of *Ternstræmia*, Ichinono, June, 1904. They are fine gatherings of precisely our common English form. B.M. 2001, 2002, 2003.

D. effusum Link. "On fallen leaves, bark, &c., in farm-yard," K.M. Ichinono, Kii. June 25th, 1904. Typical, with white stalks, columella and capillitium; spores $8\ \mu$ diam. B.M. 2004.

**Stemonitis splendens* Rost. On dead trunks. Kuragaridani, Nachi. Aug. 17th, 1903. This is a fine specimen; the sporangia are 18 mm. long, and are of the form *fenestrata*, in which the persistent sporangium-wall is perforated with round openings between the meshes of the superficial net. B.M. 2005.

**Lamproderma arcyronema* Rost. "On rotten stumps, covered with a very fugacious pellicle, like quicksilver in colour," K.M. There are four fine examples of this species; the capillitium is more slender than in most specimens received from the United States, but is similar to that in the former collection from Japan sent by Prof. Miyoshi. Gathered in Kii province, summers of 1903-5. B.M. 2006, 2007, 2008, 2009.

Cribraria tenella Schrad. On old shingles. Tanabe, Kii. Summer, 1905. This is a characteristic form: the cup is either small or wanting; the numerous subhemispherical nodes are each connected with those adjoining by four or five slender threads; there are scarcely any free rays; the slender stalks vary in length from 1.5 mm. to 2.5 mm. B.M. 2010.

C. intricata Schrad. var. *dictydioides*. On dead stumps. Isaida, Kii. Aug. 2nd, 1905. There are many free rays, but there is a tendency towards *C. tenella* in the nodes being to a great extent hemispherical. B.M. 2014.

Lindbladia Tubulina Fr. There are three examples of this species. One is a remarkable form, "on dead stump." Isaida, Kii.

Aug. 2nd, 1905. It consists of several pulvinate æthalia about 2 mm. broad; the walls of the convoluted sporangia are perforated as in *Enteridium*, producing a network with rounded meshes; a convex membranous cap, mottled with plasmodic granules, forms the apex of each sporangium. B.M. 2011. A second specimen is on fallen leaves. Mifureyama, Seto, Kii. January, 1902. The æthalia are composed of convoluted sporangia of the usual type; the sporangium walls are densely strewn with clusters of dark plasmodic granules. B.M. 2012. A third is var. *simplex* Rex, on dead trunks. Inyônataki, Nachi, Kii. Aug. 11th, 1903. It consists of several clusters of cylindrical sporangia, each about 1 mm. long and 0.3 mm. broad; the number of individuals in a cluster varies from about six to forty; they are either closely adhering, or free in the upper half, sessile or shortly stalked; the convex membranous caps are beset with dark plasmodic granules, arranged in a net-like pattern, such as is often seen in *Cribraria argillacea*. This variety has, to our knowledge, been recorded hitherto only from the United States. B.M. 2013.

**Tubulina fragiformis* Pers. "On rotting hollow *Pasania cuspidata*," K.M. Isaida, Kii. July 8th, 1905. The clusters of sporangia vary in size; some are pulvinate with the usual contour; others are small, and have a stalk-like base; spores 5 to 6 μ . It suggests an intermediate form between *T. fragiformis* and *T. stipitata* Rost. B.M. 2015.

T. stipitata Rost. There are two specimens of this species. One "on rotting stump of camphor-tree" K.M., Isaida, Kii, July 8th, 1905—consists of small clusters on long common stalks, varying in thickness according to the number of the sporangia. B.M. 2016. The other, on rotten stump—Nachi, Kii. June 15th, 1904—has subellipsoid sporangia, arranged in numerous bunches of seven or more on comparatively slender stalks, but crowded together so as to form large cushions. B.M. 2026.

Trichia Botrytis Pers. var. *a*. On logs. Mukôyama, Nachi. It is our most frequent English form. B.M. 2017.

Hemitrichia clavata Rost. Two specimens, on rotting stumps. Nachi. June and July, 1903. One is mostly immature, but both are quite typical. B.M. 2018, 2019.

H. Serpula Rost. On sticks. Ichinono, Kii. Spring, 1903. Perfectly formed and typical. B.M. 2020.

**Arcyria albida* Pers. There are four specimens, very similar in character, from Nachi, 1903 and 1904. The sporangia are ovoid, and shortly stalked, white or grey in colour; the threads of the capillitium are closely warted, as in our most frequent English gatherings. B.M. 2021, 2022, 2023, 2024.

**A. punica* Pers. On dead stumps. Mt. Nachi. Aug. 4th, 1903. Typical. B.M., 2025.

Lycogala conicum Pers. "On bark on earth. Ichinono, Kii. May 7th, 1903. Horny, deep scarlet, then umber," K.M. The specimen consists of a few æthalia about 1.5 mm. high by 0.8 mm. broad, with characteristic dark vesicles. B.M. 2027.

**L. miniatum* Pers. "On rotten chips, &c. Ichinono, Kii. May 25th, 1904. Plasmodium bright yelk-yellow." K.M. Small globose æthalia. Typical. B.M. 2028.

NOTES ON CORNISH PLANTS.

By H. W. PUGSLEY, B.A.

THE following notes are the result of observations during two short holidays in Cornwall, the first, in June, 1902, extending over ten days only, and divided between Penzance and the Lizard; and the second in September, 1905, of somewhat longer duration, and spent partly at Penzance and partly at Newquay. In some of the excursions from the last-named place I was accompanied by Dr. C. C. Vigurs, without whose intimate acquaintance with the plants of the district I should probably have missed such rarities as *Mentha crispa*.

The localities cited are additional to those published in Mr. F. H. Davey's *Tentative List*, and, with the exception of the very few near Lostwithiel, fall within vice-county No. 1, West Cornwall.

Ranunculus parviflorus L. Lizard Town.

Glaucium flavum Crantz. One plant at Marazion, 1902.

Fumaria capreolata L. Between Newlyn and Mousehole. A form with the fruiting pedicels less recurved than in the type and resembling those of *F. purpurea*.—*F. purpurea* Pugsley. Between Penzance and Madron, 1902. A handsome, large-flowered form.—*F. Boræi* Jord. Helston; Gulval; frequent between Newlyn and Mousehole.—*F. confusa* Jord. About Lizard Town; Madron; frequent between Newlyn and Mousehole; above Sennen Cove.—*F. occidentalis* Pugsley. In the Newquay District from St. Columb Porth to East Pentire, but in 1905 nowhere abundant, owing possibly to the dry season; Helston, 1902 and 1905; near Penzance, 1902.

Cakile maritima Scop. In the sands below Crantock, near Newquay.

Sagina maritima Don. At the Lizard, near Caerthillian; Tolpedn-penwith.

Buda marina Dum. Abundant on a waste on the sea-front at Penzance, 1905.

Medicago denticulata Willd. Newlyn; Mousehole.—*M. arabica* Huds. Penzance.

Trifolium subterraneum L. Above Porthcurnow, towards the Logan Rock.—*T. Bocconi* Savi. Along the Kynance Valley.—*T. striatum* L. Porthcurnow.—*T. elegans* Savi. Field above Penzance, towards Madron. The distinctions between this and *T. hybridum* L. do not seem very satisfactory; in Rouy & Foucaud's *Flore de France* the latter is shown as a subspecies of *T. elegans*, under the name of *T. fistulosum* Gilib. Fl. Lithuan. 4, p. 86.—*T. procumbens* L. A plant occurs on the Lizard cliffs which is not the pale-flowered form usually found in Britain (*T. procumbens* β *minus* Koch = *T. procumbens* Schreb. = *T. Schreberi* Jord.), but the variety *a majus* Koch (= *T. campestre* Schreb.), which is not mentioned in British floras except for the brief notice in Mr. N. E. Brown's Supplement to *English Botany*. The differences between the two varieties, both of which appear to be well known on the Continent, are clearly

given in Koch's Synop. Fl. Germ. ed. iii. p. 153, and the golden flowers of *T. procumbens* and *majus* would seem to recall *T. agrarium* rather than our common sulphur-flowered variety *minus*. At the Lizard, where it appears to be native, growing in company with *T. strictum* and other clovers, the plant is dwarfed by exposure, and thus rendered inconspicuous; and this presumably is the cause of its not having been hitherto reported. I learn from Mr. Davey that he has recently noticed it at other places in Cornwall, not only on the coast but also inland. This variety is recorded in Townsend's *Flora of Hampshire*, ed. ii. p. 105, and in Pryor's *Flora of Herts*, p. 112; and I have myself seen it growing in a fallow field at Woolacombe, N. Devon; but in all of these localities it is probable that it is only an introduction.

Prunus Cerasus L. Roadside near Helston.

Poterium officinale Hook. f. Kynance Down.

Aster Tripolium L. On the cliffs above Pentreath Beach, near Kynance.

Inula crithmoides L. Sparingly on the cliffs at Bedruthan Steps.

Anthemis Cotula L. Plentiful in a field at Newquay.

Senecio (*Cineraria* DC. $\times$ *Jacobæa* L.). While at Newquay in September last I remarked a patch of *Senecio Cineraria* DC. established on the cliffs, an outcast from one of the village gardens, and noticing close by a good many plants of the common ragwort, it occurred to me that the hybrid between these species might also be found. A short search was rewarded by the discovery of two plants that undoubtedly were of this origin, agreeing almost exactly with the description and figure in this Journal for 1902, p. 401, t. 444, of the prevailing hybrid form (*S. albescens*) found by Messrs. Burbidge and Colgan on the cliffs near Dublin.

Erica Watsoni Benth. A single plant of this beautiful hybrid heath on Newlyn East Downs, where the parent plants, *E. ciliaris* and *E. Tetralix*, are abundant.

Gentiana Amarella L. In short turf by the river Gannel, below Crantock.

Lithospermum officinale L. Plentiful on the bushy slope above the Gannel, near Crantock.

Antirrhinum Orontium L. Field near Chy-an-hal Moor.

Euphrasia occidentalis Wettst. Porthcurnow; confirmed by Mr. Townsend.—*E. curta* var. *glabrescens* Wettst. Specimens from Chy-an-hal Moor are referred to this variety by the Rev. E. S. Marshall.

Pedicularis palustris L. With *Lobelia urcns*, near Lostwithiel.

Mentha longifolia Huds. var. *nemorosa* (= *M. nemorosa* Willd.). In a field at Crantock. It seems doubtful whether this plant should stand as a variety only of *M. longifolia*. It differs essentially from the type, not only in the foliage, but in the very much larger flowers.—*M. piperita* L., var. *vulgaris* (Sole). Crantock and Treago, near Newquay.

Plantago lanceolata L. var. *sphærostachya* Röhlings. In the turf above Tol-pedn-penwith.

Chenopodium murale L. Slopes of East Pentire, Newquay; Sennen.

Polygonum lapathifolium L. Close to the *Lobelia urens* locality near Lostwithiel.

Euphorbia exigua L. var. *retusa* DC. In cultivated fields at Newquay.

Orchis Morio L. Sparingly on Kynance Down.

Scilla autumnalis L. Cliffs at Kynance.

Scirpus cernuus Vahl. var. *monostachys* Syme. Cliffs above Bedruthan Steps.

Schæenus nigricans L. Small bog on the hillside north of Mawgan; coast near Porthcurnow.

Carex arenaria L. Sandy beach at Marazion.—*C. muricata* L. Roadside bank between Penzance and Madron.

Agrostis setacea Curtis. Newlyn East Down.

Bromus brachystachys Hornung. A plant apparently belonging to this German species, although not agreeing entirely with the specimens in Herb. Mus. Brit., was growing in quantity in a clover-field at Madron in 1902.

Asplenium lanceolatum Huds. Newlyn.

Lastræa æmula Brackenbridge. This is stated in the *Tentative List* to be quite as common as *L. dilatata*, but in 1902 I saw it nowhere except at Tremethick Moor, near Penzance, and in 1905 only in one place near Lostwithiel.

TWO SYNONYMS OF EUCALYPTUS CAPITELLATA SM.

By J. H. MAIDEN, F.L.S., Government Botanist, Sydney.

1. *E. CAPITELLATA* Sm. var. (?) *LATIFOLIA* Benth. "Leaves short, obliquely ovate, very thick and much more straight, the bark deciduous (*Robertson*). Victoria. Heath near Portland, *Robertson*. Possibly a sessile-flowered form of *E. santalifolia*, but the form of the calyx is more that of *E. capitellata*, and quite different from that of *E. santalifolia*, var. *Baxteri*" (Benth. Fl. Austral. iii. 206).

The following specimens from J. G. Robertson are in the Sydney Herbarium:—(a) "Heath near Portland Bay, 20th March, 1842" (twigs bearing fruit); (b) "Heath, ten miles west of Roseneath, Glenelg River. Bark not deciduous, timber white, from ten to thirty feet high, 21st January, 1844, no. 498" (twigs bearing buds); (c) "Heath, Steepbank Rivulet, growing at foot of no. 498, and supposed to be young of it, 12th June, 1843, no. 500" (young foliage). These are all *E. capitellata*, not differing sufficiently from the type to be called a variety. They are, indeed, very close to the Port Jackson specimens, and certainly not broader leaved.

2. *E. SANTALIFOLIA* F. v. M. var. (?) *BAXTERI* Benth. "The heads of the flowers are very much like those of *E. dumosa* var. *conglobata*, but the operculum and the anthers are quite different. Fruit not seen" (Benth. l. c. iii. 207).

The specimens in the British Museum, on which Bentham based his variety, are labelled by Brown "*Eucalyptus*, Mr. W. Baxter, received 1828; probably South Coast, perhaps Kangaroo Island, or very possibly V. D. Land." Bentham has written on the sheet, and quotes in Fl. Austral., the name *E. Baxteri* R. Br.; but Mr. Britten informs me that this name does not appear in Brown's MSS.

By the courtesy of the Museum authorities, I possess drawings of the specimens referred to. Both are twigs in flower and plump bud, and are precisely matched by the following in the Sydney Herbarium: (a) "Major Mitchell's Heath near Portland, 20th March, 1842" (*J. G. Robertson*, no. 503); (b) "Five miles from Portland, on road to Bridgewater Bay, shrub 6-10 feet high, 5th February, 1844" (*J. G. Robertson*, no. 497). Both these specimens are in flower and in early fruit; no. 503 in ripe fruit also. Both are *E. capitellata* Sm. Some of the leaves of the Portland Bay specimens resemble those of some Victorian and South Australian examples of *E. Muelleriana* Howitt (*E. pilularis* Sm. var. *Muelleriana* Maiden), but the buds and fruit are different, the buds especially so.

Bentham's inclusion of Baxter's specimens under *E. santalifolia* F. v. M. (*E. diversifolia* Bonpl., see my *Revision of Eucalyptus*, p. 197) is a mistake. *E. diversifolia* has uniformly narrower leaves, not to mention other points. At the same time the geographical limits of *E. capitellata*, *E. diversifolia*, and *E. pilularis* Sm. var. *Muelleriana* unite near the Victorian-South Australian boundary, and botanists would do well to be on their guard not to commit the pardonable error of confusing them through imperfect material.

Portland Bay is on the South Coast, two hundred and thirty miles west of Melbourne, and about the same distance east of Adelaide.

INTRODUCED PLANTS AT SYDNEY, 1802-4.

[Among the miscellaneous papers of Robert Brown preserved in the National Herbarium is a list of plants noted by him as introductions during his visits to Sydney, 1802-4; of this the following is a copy. It has not seemed worth while to add the modern synonymy, as the plants will easily be recognized by the names given.

Of the two plants to which a ? is prefixed, there are no specimens of *Lepidium didymum* (*Senebiera didyma*) from Brown in the Herbarium, but *Cotula coronopifolia* is well represented. Of *Malva capensis* (*Malvastrum capense*) we find no mention elsewhere as an introduced plant; we have no specimens from Brown, nor do we find any reference to it in his MSS.—ED. JOURN. BOT.]

PLANTÆ INTRODUCTÆ VICINITATIS PORTUS JACKSON.

Plantago major. Ubique ad margines viarum.

Nicotiana Tabacum. In ruderatis et ad vias prope Sydney.

Datura. In ruderatis ad Sydney et Parramatta.

Solanum sodomium.

Physalis pubescens.

Asclepias fruticosa.

Daucus Carota.

Apium graveolens.

Silene anglica. Prope Sydney.

Lythrum hyssopifolium. Ad vias prope Sydney.

Euphorbia Peplus. In hortis ubique.

Fragaria vesca.

Stachys arvensis. Prope Sydney.

Erodium moschatum. Ad Parramatta.

? *Lepidium didymum.* Ubique ad vias.

Vicia sativa.

? *Cotula coronopifolia.*

Malva capensis. Ad oppidum Sydney prope domum D. Chapman.

Poa annua.

Panicum Dactylon.

Phalaris canariensis.

Lolium temulentum. In agris frequens vitium.

Lolium perenne. Rarius ad vias.

Briza virens [minor]. Prope domum Gubernatoris ad Sydney.

Anagallis cærulea. Prope domum D. Caley ad Parramatta.

Scleranthus annuus. In hortu D. Caley.

Cerastium vulgatum. In hortu D. Caley.

Anagallis arvensis. In vicinitate Sydney.

Urtica urens. In ruderalis, &c. prope Sydney.

HARDWICKE'S BOTANICAL DRAWINGS.

BY JAMES BRITTEN, F.L.S.

AMONG the volumes of drawings in the library attached to the National Herbarium is one containing a small collection made, evidently by a native artist, during the journey of Captain (afterwards Major-General) Thomas Hardwicke to Sirinagur in the spring of 1796, which forms the subject of a paper by Hardwicke, with an enumeration of the plants noticed, in *Asiatick Researches*, vi. 309–381. These drawings, which are accompanied by long and careful descriptions in Hardwicke's hand, form part of the collection forwarded by Dr. William Hunter, who accompanied the expedition, to George Hilario Barlow, "Secretary to the Government," with a letter, dated Calcutta, 13th Sept., 1798, which is prefixed to the volume; it runs:—"At the desire of Captain Thomas Hardwicke, I have the honour to send you drawings, and descriptions of the plants enumerated in the enclosed List, most of which were found on a tour from Futtehghurh to Sirinagur. It is the request of Captain Hardwicke, that the drawings and descriptions may be transmitted by Government, to the Hon'ble the Court of Directors; and he entertains the hope, that if any of them shall appear to Sir Joseph Banks and Dr. Smith, to be worthy of publication, the Hon'ble Court may do him the honour of inserting them, in the

work on Indian Plants, now publishing at their expence. The drawings and descriptions have been examined by Dr. Roxburgh, who has affixed specific names to some that were left blank by Captain Hardwicke." Another letter in the volume is from Hardwicke to Banks, written from Calcutta, Dec. 15, 1818, from which it would seem that the drawings, or some of them, had come again into his possession: he says:—"I must I fear be considered among the unprofitable and least worthy of your correspondents; but I continue to hope the reasons I have already stated for not being more communicative will still plead my apology and render the little I do offer on the present occasion an acceptable contribution to the Linnean Society. I have taken the liberty of making you the medium of laying them before the Society with a view that they should be entirely at your disposal; for in whatever way they may acquire publicity the advantage of your giving it is most desirable. In my humble knowledge they have novelty to recommend them: but you, Sir Joseph, possessing more ample means of reference to authorities will easily determine this point. I have added short descriptions of each subject, and if you should be pleased to publish them, may I beg you will add or diminish whatever appears to you necessary. . . ."

It does not appear that the drawings were submitted to the Linnean Society, nor are there any letters to or from Hardwicke in Banks's correspondence. Only a few of the drawings were sent to Banks; the remainder, Dr. Prain thinks, are at Calcutta. Those we have present certain features of interest, and I think it may be worth while to publish a list, with identifications.

Hardwicke, who finds no place in the *Dictionary of National Biography*, was of course chiefly eminent as a zoologist; but, as his MS. descriptions show, he was also a botanist of no mean order, although the records of his work are but slight. He is not mentioned in the introduction to Wight and Arnott's *Prodromus*, nor included among the collectors enumerated in the introductory essay to the *Flora Indica*; and David Don, in his preface to the *Prodromus Floræ Nepalensis*, does not mention his collections, though he refers to "plantas nonnullas in Principatu Sirinagur, seu Gara aut Garawhal nuncupato, lectas ab altero ex collectoribus Wallichio obtemperantibus cui nomen Kamroop,* ex Brahmanorum ordine." Nor are the Mauritian plants, of which he sent 247 to Banks in 1811-12, referred to in the *Flora of Mauritius*; this, however, is less surprising, as the National Herbarium was but slightly if at all consulted in the preparation of that work. His Indian plants are neither in the National Herbarium nor at Kew, though Mr. Hemsley informs me that in 1828 Sir William Hooker named for him a considerable collection of drawings and plants.

The collection to which the drawings belong was made in 1796, by which time he was already proficient in botany. He must have

* This collector's name is given as that of a locality under *Adiantum venustum* in Hooker's *Species Filicum*, ii. 41.

pursued the science with much ardour, for in 1804 Smith, in his preface to *Exotic Botany*,* speaks of the "immense collection of botanical drawings, the most accurate and beautiful ever brought to England," which Hardwicke had placed at his disposal, and of which, in the work in question, he made considerable use. From this it would seem that Hardwicke was then in this country. In 1807, in a letter to Smith from Calcutta,† he speaks of his collection of botanical drawings, and of a shipwreck—"the loss of the *Lady Burgess*"—in which he lost "valuable books and papers" and "drawings of insects." From this correspondence it is evident that he was on terms of intimacy with Roxburgh (who named in his honour the genus *Hardwickia*), Buchanan (afterwards Hamilton), and Fleming‡; he also mentions having "dispatched a parcel of seeds for the Marquis of Blandford." In 1811–12 he sent Banks the collection of Mauritius plants to which reference has already been made; he also sent Mauritius plants and a MS. volume of descriptions to Lambert; these I am unable to trace. At the beginning of 1812 he was at Cape Town; here he wrote the descriptions accompanying a collection of rather feeble drawings of trees, signed C. H. W. and J. W. B., which form a small volume; this, with specimens of the woods of each and of other woods from South Africa and St. Helena, was bequeathed to the British Museum, amounting in all to 1482. From St. Helena he brought a tub of living plants to Kew. In 1812–13 he served on the Council of the Linnean Society, of which he had become a Fellow in 1804. In 1815 he wrote to Robert Brown from Wisbech, announcing that he was leaving England "in the end of March or beginning of April." According to a note in the Report of the British Association for 1845 (p. 188), Hardwicke's final return to this country "took place in 1818"; but this can hardly have been, as his letter to Banks from Calcutta, already quoted, bears date Dec. 15 of that year. He served on the Council of the Linnean Society in 1824–25, and again in 1832–34; in 1826, he wrote to Brown from Greenwich, and in 1828, when he sent plants to Hooker to name, he was living at Clapham. J. E. Gray's *Illustrations of Indian Zoology*, "chiefly selected from the collection of Major-General Hardwicke," was published in 1830–35; to this what is evidently an excellent portrait, lithographed by Louis Haghe from a painting by J. Lucas, is prefixed. Hardwicke died at his residence, South Lodge, Lambeth, on March 3, 1835, in his seventy-ninth year.

The following is a list of the drawings, in the order in which they stand in the volume and with the number attached to each.

15. CARYOPTERIS WALLICHIANA Schauer (*fide* Prain). *Volkameria? bicolor* Roxb. MS.: *Asiatick Researches*, vi. 366. In the letter from

* It would appear from a remark by Smith in his letter to Banks about Salisbury (Jan. 10, 1806) that the latter was "mortified at not getting Col. Hardwicke's drawings for publication himself" (*Banks Correspondence* (MS.), vol. xvi.).

† Smith, *Correspondence*, ii. 118.

‡ He was also acquainted with Wallich, who refers to him (*Pl. As. Rar.* ii. 11) as "my highly esteemed friend," and (*op. cit.*, pref.) mentions him among those who sent plants to the Calcutta Garden.

Hunter, already quoted, it is stated that Roxburgh named the drawings which "were left blank by Captain Hardwicke," and his help is acknowledged under various species in Hardwicke's paper. This name is not taken up in the *Index Kewensis*, for which the paper seems to have been imperfectly examined. The drawing is localized: "Coadwara, 20th April, 1796. T. H."; in the description is added, "Found on the sides of the Koa Nullah": the "country name," not given in the printed paper, is "Unga-reea." I quote localities and names only when these are omitted from *As. Res.* The descriptions printed are not identical with those in MS.; the latter are more detailed, and, as we shall see later, sometimes more accurate.

A copy of this drawing and of others of the series—*e.g.*, no. 55—is in the large collection formed by Dr. Fleming, now incorporated in the arranged series of plates in the Department of Botany. This collection, numbering 1825 drawings, was purchased in 1882; it was then in thirteen folio volumes. Fleming died in 1815, and I know nothing of the history of the drawings before they came into our possession. They are by native artists, and include copies of many of the plates in Roxburgh's *Plants of Coromandel*, probably made from the originals for that work. In the end of the eighteenth and in the earlier part of the nineteenth century, such collections of figures seem to have been common; we have in our arranged series a set from the Saharanpur Gardens, and another from Dr. Patrick Russell (1805), whose drawings are also included in the Kew collection: those of Buchanan (Hamilton) have been already noticed in this Journal (*Journ. Bot.* 1902, 279). Hardwicke incidentally refers (*As. Res.* vi. 367) to "the extensive and invaluable collection of Mr. R. Bruce," who at that period was "about to enrich the science of botany" with "many new genera." Is anything more known of Bruce and his work?

16. *PHLOGACANTHUS THYRSIFLORUS* Nees. *Justicia thyrsiformis* Roxb. MS.; *As. Res.* vi. 349: "the trivial name is added on the opinion of Dr. Roxburgh"; it is not in *Ind. Kew.* "Amsour 21st April 1796, T. H."; "Annet, country name."

24. *SAUROMATUM GUTTATUM* Schott. This does not appear in the printed paper. "Neem-kerowly, near Futtehghur, March 1796, T. H." "Buzze-kund, D,hey, Bund-kanda, names in the Dooab and in Rohilcund."

29. *CATAMIXIS BACCHAROIDES* Thoms. *Prenanthes*, *As. Res.* vi. 369. This is the most interesting of Hardwicke's finds. It is named in MS. by Roxburgh "*Prenanthes procumbens* Rox."—*i.e.* *Lannæa nudicaulis*, with which it is impossible to suggest how Roxburgh could have confused it. It was described and figured by Thomson in *Journ. Linn. Soc.* ix. 343, t. 4 (1866), from specimens collected in West Himalaya by Stewart; in the *Flora of British India* (iii. 389) Royle is the only collector mentioned; but Mr. E. G. Baker, who has checked my determination by reference to the Kew Herbarium, tells me that there are also specimens from Mr. Duthie and from Edgeworth. Hardwicke's drawing gives one

the idea of a more diffuse shrub than is represented in Thomson's plate, but the two are evidently identical.

The identity of *Catamixis* with the "Prenanthes" of As. Res. has not, I think, been suspected; nor is this remarkable, as the printed description differs in important particulars from Hardwicke's MS.—for example, the leaves are described as "about six inches long, white beneath, with a dense cottony down and the florets as constantly four." In view of these errors, and because of the interest attaching to the plant, it may be worth while to transcribe Hardwicke's original description, which contains details—*e. g.* as to the colour of the flowers—which do not appear in the published accounts, and also affords evidence of the writer's careful observation:—

"Found (April 7th 1796) growing out of the indurated clay banks of the Ganges on the east side the River one mile below the Town and bathing stairs of Hurdwar; then in full flower and very ornamentally hanging over the banks in considerable quantities. *Root* repent, penetrating the hard earth to a great distance; of a pale yellowish white. *Stem* procumbent, suffruticosus, straggling, slender, marked on all sides with the vestiges of fallen leaves, branching. Branches alternate, similar to the stem. *Leaves* without order on all sides of the branches, numerous, petioled, obovate, widely serrated—entire towards the base; of a bright green above, paler beneath; one nerved, veins slender and rising at an acute angle with the nerve. Petioles of a medium length, flat above and channel'd, convex beneath. *Flowers* in panicles resembling a corymbus, terminal, very numerous; the divisions of the panicle alternate; peduncles cylindrical; petals white ornamented with red antheræ, and the highly coloured scales of the calyx. *Bractææ* solitary, one at the foot of every division of the panicle & proper peduncle, linear, pointed. *Calyx* common, imbricated, columnar; scales many, unequal, smallest at the base, gradually larger upwards, the five forming the interior cylinder longest, converging and highly coloured at the tips (of a deep red) lanced, concave erect; when dry rigid at their points. *Corolla* compound, uniform; florets hermaphrodite, constantly five in number, equal, and forming a circle; the proper petal ligulate, with a truncated apex, and five toothed. *Staminæ* filaments five, capillary, very short; *Antheræ* oblong, united and forming a hollow cylinder. *Pistillum* germen slightly conical with the apex downwards; Style nearly the length of the floret, filiform; Stigma two cleft, erect or sometimes reflex. *Pericarpium* none: the converging calyx remains and matures the seeds. *Seeds* five, crown'd with a hairy pappus. *Receptacle* naked." The description is dated "Futtehgurh, June 1797, T. H."

32. ENGELHARDTIA SPICATA Bl. "*Carpinus* doubtful," As. Res. vi. 374. "Between Belkate and Nataana, April 1796. T. H." "Moha, country name."

33. TECOMA UNDULATA G. Don. Not in As. Res. "Found in a garden on the north side of the town of Atowly, about $\frac{1}{4}$ th of a mile to the right of the Road leading to Anophsheer." The description is dated "March 17th 1796," and must have been written in the

field, as the expedition started on March 3; some were transcribed later, after its return, as is shown by a note in the description of No. 39. The figure in *Exotic Botany* (i. t. 19) is from a drawing furnished to Smith by Hardwicke.

36. *ANDROMEDA OVALIFOLIA* Wall. "*Arbutus* doubtful," As. Res. vi. 360. "Adwaanee April 26th 1796. T. H."

38. *SALVIA LANATA* Roxb. *S. integrifolia* Roxb. MS. As. Res. and vi. 349. This is the type of *S. lanata* Roxb. Fl. Ind. i. 147 (1828); the name *integrifolia* was preoccupied. "Adwaanee and Teyka-ka-Maanda, April 26th 1796. T. H."

39. *ZANTHOXYLUM ALATUM* Roxb. *Zanthoxylum clava-herculis*? Roxb. MS.; *Xanthoxylon* As. Res. vi. 376. "Fig^d. on the spot, April 25th 1796."

40. *RHODODENDRON ARBOREUM* Sm. "Doubtful . . . approaches nearest to *Rhododendron*, but will probably not be admissible there; &, perhaps, will form a new genus." As. Res. vi. 360. This is one of Hardwicke's most remarkable finds; the drawing is practically the type of *Exotic Botany*, tab. 6; Smith says: "We are obliged to Captain Hardwicke for the description and a drawing, both made on the spot. It is hoped the seeds, which the gentleman has liberally distributed in England, will enrich our collections with this noble tree."

41. *ANDROSACE ROTUNDIFOLIA* Hardw. As. Res. vi. 350. This was named in MS. by Roxburgh, but it was published by Hardwicke, to whom Roxburgh (Fl. Indica, ii. 14) attributes it; Smith (Exot. Bot. ii. 107) had drawings from Buchanan and Hardwicke, who was then (1806) Lieut.-Colonel. "This beautiful little plant I found on the cool & elevated mountains near Chichooa, one day's journey south of Sireenagur; and which highly decorated a grassy lawn of small extent with its various colored flowers, & to which an intermixture of *Gentiana nana* gave a beautiful blue." The MS. description, as that of many others, is dated June 1797, Futtehghur, whence the expedition started and to which it returned. In Ind. Kew. the reference to As. Res. is erroneously given as "iv (1795)."

46. *FLUGGEA MICROCARPA* Bl. "*Herniaria*, doubtful." As. Res. vi. 357.

52. *SPIRÆA CRENATA* L. "*Spiræa*? doubtful It most resembles *S. crenata* of Linnæus." As. Res. vi. 363. "Chet-kote, 28th April 1796. T. H." "Joondaalee, country name."

54. *WENDLANDIA NOTONIANA* W. & A. Not named in MS.; I do not find it in As. Res. "On the east side of the Ganges in the neighbourhood of Hurdwar."

55. *RANDIA TETRASPERMA* Roxb. "Gardenia 3." As. Res. vi. 354. Type of the species.

56. *EUONYMUS TINGENS* Wall. "Genus not determined." As. Res. vi. 355.

57. *RHUS COTINUS* L. *Hirtella?* *tomentosa* Roxb. MS. "Doubtful genus coming nearest to *Hirtella*." As. Res. vi. 352. "Jell-toongha, country name."

58. *SYMPLOCOS CRATÆGOIDES* Don. "Doubtful." As. Res. vi. 365.

65. *FICUS LAMINOSA* Hardw. As. Res. vi. 65; so named in MS. by Roxburgh, who appends his name, but in *Fl. Indica* (ed. Carey), iii. 531, he rightly cites it as of Hardwicke. The *Index Kewensis*, following Sir J. D. Hooker (*Fl. Brit. Ind.* v. 523), substitutes for this appropriate and earliest name ("common receptacle formed of many concentric converging concave laminae," Hardw. MS.) the much later *F. saemocarpa* Miq. (*Ann. Mus.* iii. 232 (1867)). "Ghinouly 10th May 1796. T. H." "Chan-cherre, country name."

66. *DEUTZIA STAMINEA* Br. "Doubtful." As. Res. vi. 361.

67. *LONICERA QUINQUELOCULARIS* Hardw. As. Res. vi. 350. "Loung-phool, country name." Type of species.

81. *GISEKIA PHARNACEOIDES* L. *G. angustifolia* Roxb. MS. This does not belong to the Sirinagur series, but was collected in the following year; it was "found near the banks of the Ganges at Nanamow," and "figured on the spot, July 17th 1797."

SHORT NOTES.

JUNCUS TENUIS IN SUSSEX.—When looking for *Phyteuma spicatum* with Mrs. Davy, near Uckfield, we noticed this rush in a wood-riding, growing in the cart-tracks. It extended for about fifty yards, but was quite confined to the wheel-tracks. The soil was wet and stiff. At Copyhold we noticed that *Sedum Fabaria* and *Barbarea vulgaris* var. *decipiens* occurred, and *Crepis biennis* was in great beauty and luxuriance in Cuckfield parish.—G. C. DRUCE.

SISYRINCHIUM ANGUSTIFOLIUM.—In the *Standard* of June 15, Miss Lillian M. Austin records her finding of this plant near Bisley, Surrey, on June 9. Miss Austin informs me that she found only one plant with two flowering stems, which she has presented to the National Herbarium. Miss Austin also sends a letter from Dr. Edgar Willett, saying that he found a single plant in an unreclaimed part of the grounds of Wellington College, Berks, which is not very far distant; this was in 1874 (see *Fl. Berks*, 482). In the *Gardeners' Chronicle* for 1871, pp. 901, 937, the plant is recorded from near Christchurch, Hants, "in one part of a wood, within a radius of ten or fifteen yards, where it is very abundant. It grows amongst low thick oak underwood and long rank grass, the place being a moist one, and near a small running stream which comes from the direction of the New Forest. There is a small cottage and garden near the edge of the wood, about 100 yards from the place where *Sisyrinchium* is found to the northwards, the prevailing wind being W.S.W. No other garden is near, and the wood is a private one" (see also *Journ. Bot.* 1871, 242). The specimen sent to the *Chronicle* is in the British collection of the National Herbarium; the name of the correspondent was not given, and the plant does not seem to have been recorded again from this locality. Mr. Townsend (*Fl. Hants*, ed. 2, 425) quotes this record, and adds: "Mr. E. F. Linton

informs me that one of Mr. Pritchard's nurserymen assured him that a plant growing in a wood in the neighb. (*sic*) was the same as an American? species in their garden with mauve to purplish fls. It therefore seems likely that both *S. Bermudianum* and *S. angustifolium* occur in the neighb." Mr. Dunn does not mention any English locality for the plant in his *Alien Flora*.—JAMES BRITTEN.

MNIUM MEDIUM Br. & Sch. IN BRITAIN.—On the 15th July, 1902, I gathered, in marshy ground, on the western slope of Ben Lawers, a plant which from its habit and general facies I took to be *Mnium affine* Bland. var. *elatum* Br. & Sch. Subsequent microscopical examination showed the inflorescence to be synoicous, and the structure generally quite distinct from that of *M. affine*. I thereupon referred it doubtfully to *M. medium*, a hesitation which was shared by Mr. H. N. Dixon and Mr. A. Gepp, who, kindly comparing it with a specimen of *M. medium* of Lindberg's gathering in the British Museum, found a marked difference between the plants, both in habit and structure. Finally I sent it to Dr. Hagen at Opdal, who concludes that it is undoubtedly *M. medium*. He states that on comparing several specimens of that species in his herbarium he finds that they vary considerably in the structure of the leaves, especially in the development of the border, but that the plant under consideration possesses all the more stable characteristics of the species, the structure of the stem and nerve, the form of the leaves, and also—a character to which he attaches importance—the structure of the teeth of the leaves, which in all the specimens examined consist *at the leaf base* sometimes of one, sometimes of two cells. He adds that he has compared the plant with examples of all other species of *Mnium* which could enter into consideration, but that it differs from all of them. Mr. Dixon points out that Husnot makes *M. medium* a variety of *M. affine*, in which, however, he does not appear to be supported by any other bryologist. Apart from its dioicous inflorescence, *M. affine* differs in having the leaf-cells arranged in rows, radiating from the nerve, and less markedly collenchymatous. *M. cuspidatum* Hedw., the only other species to which it might possibly be assigned, is usually less robust, the leaf-cells smaller, the marginal teeth sharper, composed as a rule of a single cell, and ceasing some way above the base. In *M. medium* the teeth are composed usually of two cells, and extend almost to the base. The leaf-cells diminish somewhat in size towards the margin. On the same date on which this plant was gathered, my friend the Rev. C. H. Binstead discovered on another part of Ben Lawers *Hypnum turgescens* Jens., also an addition to our flora.—LLEWELLYN J. COCKS.

PRIMULA ELATIOR Jacq. IN SOUTH LINCOLNSHIRE.—Mr. J. Hawkins, of Grantham, recorded this plant as a native of the chalky boulder clay, in *The Field*, in 1905. I was more than sceptical about the matter, as I have had quite a hundred natural hybrids between *P. acaulis* and *P. veris* through my hands in the last thirty years. I have also made many experiments in crossing the three plants artificially. The conclusions drawn from these experiments were published in *The Naturalist*, 1905, pp. 203–205. On the 27th of

April last Mr. Hawkins fulfilled his promise by giving me a freshly gathered field specimen. There is no question: it is the true plant of Jacquin, not a hybrid. I have compared it with Swiss specimens I have growing here. "There are several roots growing on an arable field hedge-bank, on chalky boulder clay, bordering the road, not far from the hazel wood, near Great Ponton." This adds another vice-county—to the four already recorded—to the distribution of this rare eastern form. After much study, a species I cannot call it. The primrose, cowslip and oxlip, which from local choice of habitat are like distinct species, when brought into close proximity by nature or by art become at once confluent, like *Rubi* and *Salices*. They are simply "environment species," or "species in the making," *in posse* not *in esse* yet. Without an inkling of our modern evolutionary theories to aid him, the acute mind of Linnæus grasped all the facts which could be observed, as well over one hundred and fifty years ago as to-day, and classed the three plants as subspecies, or varieties of one species. With this definition I see no reason to disagree. It is as well, however, to point out, that in nature as well as in the garden, where they have been naturally (by bees) and artificially (by hand) crossed, their hybrids and subhybrids, and doubly and trebly crossed hybrids, are much more impermanent than the parent subspecies.—E. A. WOODRUFFE-PEACOCK.

[Mr. Woodruffe-Peacock's conclusion, for which he adduces evidence in the *Naturalist* (*l.c.*), is not that of most folk who have studied the plant, nor is it that of the latest monographer of the genus, Dr. Pax (*Das Pflanzenreich*, Heft 22, 1905), who maintains *P. acaulis* (*vulgaris*), *P. officinalis* (*veris*), and *P. elatior* as distinct species. The late Robert Holland, who grew plants from Essex for many years in his garden where they assumed large proportions, was convinced of its distinctness; and it thus impresses one who sees it growing in profusion in Switzerland: in habit, colour of flowers, and scent (resembling that of starch) the plant has an individuality of its own. Dr. Pax cites Hill, *Vegetable System* viii. 25 (1765), as the authority both for *P. acaulis* and *P. elatior*; the former, however, must be credited to Linnæus (see *Journ. Bot.* 1906, 179), and neither Hill's figure nor description—"native of our hedge-sides on high grounds"—suggests that he had in view *P. elatior* of Jacquin, who should, we think, still be maintained as the authority for the species.—ED. JOURN. BOT.]

WORCESTERSHIRE MOSSES.—Since the publication in this Journal for 1903 of Mr. J. E. Bagnall's list of Worcestershire mosses, few additions have been made to the moss-flora of the county. The occurrence of *Amblystegium compactum* Aust. on a triassic sandstone in the neighbourhood of Bewdley seems worthy of note. This has hitherto only been recorded in Britain from a few localities in Sutherlandshire, and from one in Derbyshire; in these localities it has been confined to a damp and calcareous matrix. The Worcestershire plant was gathered some time ago, and was only recently identified by Mr. Dixon, who published an interesting paper upon the occurrence of this species in Britain in this Journal for 1900

(p. 175). The record is a noteworthy one for the midlands—our rainfall is small, and the rocks on which the plant is found are distinctly dry and only slightly calcareous; that they are calcareous was evidenced by testing with an acid, as well as by the presence of *Weisia verticillata* in the locality. Another unexpected record for our county is *Andreæa Rothii* W. & M., growing on the exposed surface of the same very dry sandstone rocks in the vicinity of Kidderminster, only 200 ft. above sea-level. No record of this exists for the neighbouring counties of Warwickshire and Staffordshire, and in Worcestershire, on such hills as we have, rising in the Malverns to 1500 ft. above sea-level, it has been looked for in vain. In addition to the foregoing, the following may be added to Mr. Bagnall's list:—*Dicranella Schreberi* Schimp. Not common. Dick Brook; Seckley; Hanley Dingle. — *Campylopus fragilis* B. & S. Winterdyne and Ribbesford Wood, Bewdley; Habberley Valley, &c. (inadvertently omitted by Mr. Bagnall). — *Discelium nudum* Brid. Very rare; banks of Severn at Lincombe.—*Mnium serratum* Schrad. Rare; sandstone rocks, Severn, near Bewdley.—*Hypnum molluscum* Hedw. var. *condensatum* Schimp. Rare; rocks by streams in Wyre Forest.—The following are new localities for rarer species:—*Trichostomum mutabile* Bruch. Rocks by Severn, Upper Arley.—*Physcomitrella patens* B. & S. Blackstone, Bewdley.—*Thuidium recognitum* Lindb. Wyre Forest.—*Brachythecium illecebrum* De N. Sandstone rocks, Lincombe.—*Plagiothecium depressum* Dixon. North Wood, Bewdley.—J. B. DUNCAN.

NOTICES OF BOOKS.

Methods in Plant Histology. By CHARLES J. CHAMBERLAIN. Second edition. Pp. x, and 262. Chicago: The University of Chicago Press. London: T. Fisher Unwin. 10s. net.

THE first edition of this book met with a well-deserved success, though it was not as largely used in the laboratories of this country as its merits warranted. The distinctive feature of the book is the second portion, in which the chief groups of the vegetable kingdom are passed in review, and the most suitable methods of preparation for the more available laboratory material described. In the second edition, which has been considerably enlarged, the very valuable Venetian turpentine method—almost unknown here—is described in full details; the paraffin method is improved, and the celloidin method described in greater detail. In connexion with the latter method, Jeffrey's valuable modification, which makes it applicable to hard woody tissues, is fully treated; descriptions of certain special processes, such as the demonstration of protoplasmic continuity from cell to cell, are also added. In the second part more attention has been paid to collecting and growing laboratory material, and Klebs's methods for obtaining reproductive phases of algæ and fungi are described in connection with various forms. The work can be strongly recommended to advanced students, and especially to teachers.

V. H. B.

Plant Response as a Means of Physiological Investigation. By JAGADIS CHUNDER BOSE. Pp. xxxviii, and 781 ; figs. 278. Longmans. 21s.

PROF. BOSE is well known for his book, *Response in the Living and Non-Living*, noticed in this Journal for 1903, p. 28, in which he showed that many of the phenomena which occur in the organic world as responses to definite stimuli were also to be observed in the inorganic world, *e.g.* in a bar of metal. In the present bulky volume he attempts to show that not only do plants respond to stimuli by contraction in the same way as the muscle of an animal, but that the reaction of the plant is always of the same nature. The author's view is that all the responses of plants—whether the striking movement of the leaves of *Mimosa*, or the slow geotropic curvatures of stems and roots, whether produced by natural stimuli or by chemical and electrical stimuli—show a fundamental unity. They are but different expressions of one response, that of contraction of the protoplasm leading to a “negative turgidity variation,” and often to an actual contraction of the tissues. It is this contraction of the protoplasm which causes the well-known excretion of water from the cut petiole of *Mimosa* ; but Prof. Bose contends that this reaction is common to all plants, *i.e.* there is no real distinction between sensitive and non-sensitive plants. All plants perceive stimuli, and react in the same way to them, but it is only in a small number that the anatomical relations are such as to allow of gross structural movement. Even in mature tissues, although there is no obvious movement, and the excretion of water is difficult to observe, yet the same reaction is indicated by the fact that such tissues show, on stimulation, an electrical response—“galvanometric negativity”—which is always the accompaniment of the hydrostatic negative variation to be observed in other tissues.

The author further extends this view of the contraction of protoplasm under stimulation to explain not only geotropic and heliotropic curvatures, but also such phenomena as water-ascent and ordinary growth processes. The effect of unilateral stem-reaction by gravity and light, and the consequent protoplasmic contraction, is to retard growth on one side, and thus bring about curvatures ; the different reaction of the stem and the root to gravity being explained by the fact that in the former case the stimulus acts directly, the growing region being sensitive ; while in the second case the stimulus is indirect, since the apex of the root, not the actively growing region, is alone sensitive. In relation to water-ascent, the author is a supporter of the old “clambering” theory, with the addition of the idea of a series of rhythmic contractions passing up the root and stem which affect the living, protoplasmic cells. “We have, in fact, an active chain of pumps working throughout the length of the plant, partly carrying water themselves, and partly pumping it into the better conducting vessels of the xylem ; and there is no limit to the height to which it may, by such means, be lifted.”

Prof. Bose describes so large a number of new experiments, and his views themselves are so novel, that judgment can only be

passed upon them as a whole when these experiments have been repeated by other observers. His theory of the fundamental uniformity of all plant response is certainly most illuminating, and one for which he brings forward a great weight of evidence. Some of his experiments are, however, not very convincing, as in that in which he attempts to prove, by the successive application of cold to the two sides of an horizontally placed apogeotropic organ, that the curvature is due to the retarded growth of the upper concave side. The curvature should have been decreased by the application of cold on the lower side, since the lower temperature would retard the growth on that side; the application of cold on the other side should similarly have increased the curvature. Exactly opposite results were, however, obtained. In many cases, too, the enormous magnification to which he subjects his records makes one a little doubtful as to their trustworthiness. In his ingenious balanced "crescograph" for studying variations of growth there is a curious mistake as to the action of a syphon, the rate of flow from which would, of course, vary with the level of the fluid in the vessel to be emptied. The author sometimes shows an unfamiliarity with biological ideas when, for example, he refers to the upper and lower halves of cells as being of different age; or when he considers that all seedlings of the same "batch" will show constant heredity. In the matter of water-ascent he brings forward no direct evidence in favour of his views, and Strasburger's poisoning experiments can hardly be so lightly dismissed.

Whether Prof. Bose's views stand or fall must remain for the future to decide, but the value of his work lies in the general theory put forward, and in the fact that he is the first to apply to the study of plant response as a whole the apparatus of muscle-physiology, and to elaborate that apparatus to an extraordinary degree. The book, which is packed with hundreds of new experiments and with descriptions of numerous pieces of ingeniously devised apparatus, certainly marks an epoch in the method of attack on the problems of irritability in plants.

V. H. B.

BOOK-NOTES, NEWS, &c.

At the meeting of the Linnean Society on June 7th, the General Secretary exhibited a small oil-painting on panel of Linnæus, after Pasch (sight measure $9\frac{1}{4} \times 7\frac{3}{4}$ in.), the property of Mr. Blackwell, which he had acquired as a portrait of Jean Jacques Rousseau (the *Linnæa* having been taken for pimpernel). He had detected the error by the close correspondence of a print engraved by C. E. Wagstaff, and published by Charles Knight for the Society for the Diffusion of Useful Knowledge. This print purported to be engraved from a portrait in the possession of Robert Brown, but it displayed a curtailment of the figure and accessories from the picture by L. Pasch which Robert Brown gave to this Society in 1853 on his quitting the Chair, the history of which is well known

(*Proceedings*, 1888-90, pp. 24-25). The question was raised, could this small picture have been also in the possession of Robert Brown? In the discussion which followed, Mr. Carruthers stated that Robert Brown left all his property to his successor, J. J. Bennett, his own predecessor at the British Museum, and he was certain that if the portrait now shown had belonged to Brown, Bennett would have carefully kept it, and ensured its conservation. The Rev. Canon Smith pointed out that by a still legible label the frame must have been made not later than 1837. The first paper was by Mr. H. H. Haines, "On two new Species of *Populus* from Darjeeling," which was illustrated by a series of photographs. *Populus ciliata* Royle was redescribed, and the two new species characterized—*P. Gamblei*, which may or may not be the species described by Dode from imperfect material, and *P. glauca*. Dr. Maxwell T. Masters's paper "On the Conifers of China," was read in abstract: it described the whole coniferous flora now known, including the discoveries of Mr. E. H. Wilson and B. Hayata; eight new species are fully set out, five of these being of the genus *Picea*.

THE first *Bulletin of the Imperial Central Agricultural Experiment Station* in Japan has just been issued; it is written partly in English and partly in German. There are forty-seven somewhat similar establishments in the country, but they deal mostly with local questions and local needs. The newly formed central station aims at taking up research of more general scientific interest. The *Bulletin* contains a long and interesting account of experiments, carefully tabulated and illustrated, which treat of the properties of various salts in the soil, and of their influence on different sorts of vegetation. There are other papers dealing with plant pathology. A disease of tobacco was found to be due to bacteria which lived in the soil; they gained entrance by the roots, and spread through the plants by means of the vessels of stem and leaves. A smut of bamboo, which causes considerable loss to the bamboo growers, has been examined and its life-history worked out. A disease of rice, caused by a crane-fly, is described, and the development of the insect followed in detail.

To Fascicle IX. of his *Index Filicum* (Copenhagen: Hagerup), Herr Christensen adds a slip, begging that his attention may be called to any omissions or errors that may have been noticed in his work, in order that they may be made good in the appendix and errata, which will close the present section of the *Index*—the alphabetical enumeration of the species and synonyms. The succeeding sections of the work will be a systematic enumeration of the genera, and an alphabetical catalogue of literature. The present fascicle carries forward the enumeration from *Polypodium Beckleri* to *Polystichum aculeatum*. In view of the immense number of citations given by the author it is astonishing how free his work is from errors. And the more one uses the *Index* the more one realizes how terribly fern-students were handicapped before the author began his publication, and how potent a factor the *Index* will prove in saving time, and in tracking out the mazes of pteridological nomenclature.—A. G.

JAMES MORRISON CROMBIE, who died at Ewhurst, Surrey, on May 12, was born at Aberdeen on April 20, 1833.* At the age of fifteen he entered the Marischal College, Aberdeen, where, as subsequently at Edinburgh University (where he graduated M.A), he had a distinguished career. He early gave attention to natural history, and Prof. William Macgillivray, his "first instructor in natural science," said: "He will distinguish himself as a botanist." In 1858 he was licensed in Edinburgh in the Established Church of Scotland, of which he was ordained minister in 1862. During his ministerial probation at Castleton he published a little book on *Braemar: its Topography and Natural History* (1861). Crombie came to London in 1866 as assistant to Dr. John Cumming, who was then at the height of his notoriety; afterwards he went to Swallow Street Presbyterian Church, of which he was minister until 1879; he had previously become clerk to the Scottish Synod in England in connection with the Church of Scotland, a post which he was compelled by ill-health to resign in 1903. Crombie became a visitor to the Department of Botany in 1869, in which year he published in this Journal his first paper on lichens—new species collected by himself in 1865–8, and described by Nylander in *Flora*. As a lichenologist, Crombie was dominated by Nylander, and, like him, an unflinching opponent of the Schwendenerian hypothesis of the dual constitution of lichens; upon this hypothesis Crombie made three or four onslaughts, one of them in the *Encyclopædia Britannica* (1882). For many years he was a frequent visitor to the Museum, where he prepared the *Monograph of Lichens found in Britain*—a descriptive catalogue of the species in the Herbarium—of which the first volume was published in 1894; of the second volume, unfortunately, owing to a dilatoriness largely consequent upon failing health, only a small portion was prepared for publication; steps, however, are being taken for the completion of the work. Crombie had previously issued (in 1870) *Lichenes Britannici*, an enumeration, with notes in Latin of habitats and localities, of the lichens of the United Kingdom. Between 1869 and 1893 Crombie published a large number of papers, mostly in this Journal, *Grevillea*, and the *Journal of the Linnean Society*. Most of these were concerned with British lichens, but he also described novelties from Kerguelen Land, the Cape of Good Hope, Rodriguez and Madagascar; he also worked out Robert Brown's collections in Melville Island and Australia, and the lichens of Dillenius's and Withering's herbaria. He published two centuries of exsiccata of British lichens (1874, 1877), and prepared for the National Herbarium a very beautiful series of "type" specimens. During his lifetime a large portion of his herbarium was purchased for the National Herbarium by the Trustees of the British Museum; the remaining portion and all his botanical MSS. have been presented to the Herbarium by his widow. Crombie became a Fellow of the Linnean Society in 1869; he was also a Fellow of the Geological Society, and one of the fifty Honorary Fellows of the Royal Historical Society. He was Lecturer on Botany at St. Mary's Hospital from 1879 to 1886.

* There seems some uncertainty as to this date, which we give as he himself wrote it in a book of autographs; on his coffin the year is given as 1830.

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SOME MARINE ALGÆ FROM NEW SOUTH WALES.

BY A. AND E. S. GEPP.

(PLATE 481.)

THE following notes treat of a collection of marine algæ from New South Wales, made by Mr. A. H. S. Lucas, and sent to us through his kindness, and by the courtesy of Dr. J. H. Maiden, Director of the Sydney Botanic Gardens. The specimens, though small in number, are some of them very interesting, partly from their rarity, and partly from their size and good condition. They are mostly well-chosen characteristic examples, and some of them are new to science, or are very little known species. Some have been determined with difficulty, notably the large membranous red algæ, several of which occur on the Australian coasts, and are so alike in external appearance as to be almost indistinguishable to the mere collector; indeed, before the days of improved microscopes, they were apt to be placed in genera with which they had but little in common. It is to the close scrutiny of the microscopic structure made by J. G. Agardh that we owe the allocation of these plants in their proper genera—such as *Kallymenia*, *Halymenia*, *Chrysomenia*, *Grateloupia*, *Glaphyrymenia*, *Pachymenia*, *Epiphylæa*, and so on. And as regards this type of alga, it may well be that Australian waters are not yet exhausted.

The actual novelties described in this paper are two new species—*Dictyota prolificans* and *Gracilaria Lucasii*; also new varieties of *Rhabdonia robusta* and *Grateloupia filicina*, and a new form of *Pterocladia lucida*. The cystocarps of *Kallymenia tasmanica* and *Grateloupia australis* have been found for the first time, and the latter species, though published in 1892, has remained a *nomen nudum* until now, thus necessitating a description in the present paper.

The characters of the fertile frond of *Dictyota nigricans* are shown in the plate, no figure of that plant having been published before. The distribution area of *Pterocladia capillacea* has been vastly extended, and *Gracilaria Textorii*, hitherto known only from Japan, has been found in perfect fruiting condition in New South Wales, affording a fresh instance of the relation between the marine floras of Japan and East Australia.

Mr. Lucas's interesting notes have been of great assistance to us, and are embodied in the paper. A complete set of his specimens has been placed in the Herbarium of the British Museum.

CALOTHRIX ÆRUGINEA Thuret. In rock-pools; Barwon Heads, Victoria, January, 1903; A. H. S. Lucas, no. 15. Growing on *Corallina rubens*.

Geogr. Distr. Mediterranean, North and South Atlantic, Red Sea, Pacific.

MICRODICTYON UMBILICATUM Zan. Sandringham, Botany Bay,

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January, 1904; *A. H. S. Lucas*, no. 20. Mr. Lucas says he has found specimens eighteen inches square in full summer.

Geogr. Distr. Mediterranean, Atlantic, Red Sea, Pacific.

This appears to be precisely the same as the Australian specimen issued by Harvey under the no. 568.

Codium elongatum J. Ag. Farm Cove, Sydney, July, 1901; *A. H. S. Lucas*, no. 27.

Geogr. Distr. Mediterranean, North and South Atlantic, Cape of Good Hope, Japan.

Dictyota nigricans J. Ag. Barwon Heads, Victoria, Bass's Straits, January, 1903; no. 14. Mr. Lucas found this thrown up with multitudinous *débris*.

Geogr. Distr. West Australia, Tasmania.

Fig. 1 represents a small portion of the fertile thallus of this plant in surface view, as this species has never been figured before. It shows the proliferations and scattered sporangia, for the sake of comparison with the following species.

***Dictyota prolificans*, n. sp.** Fronde subdecomposito-dichotoma, supra axillos sub-acutos vel rotundatos segmenta linearia elongata inferne sæpe angustiora apice rotundata gerente, e tota plantæ adultioris superficie (apicibus et marginibus exceptis) phyllis minutis dense at sub-gregatim prolifera; cellulis fertilibus in areas maculæformes oblongas congestis.

Long Bay, New South Wales, July, 1903, and April, 1900; *A. H. S. Lucas*, no. 22. Queensland, *W. Alcock Tully* in Herb. Brit. Mus., with antheridial sori.

Mr. Lucas, in comparing this species with the preceding, says that he has found no. 22 only near Sydney, that the fronds are always smaller, firm, and linear, while those of no. 14 are larger, palmatoid, and flexible, and are found in Bass's Straits. In 22 the sori are always large and conspicuous, while in 14 the fruits are mostly single.

The type-specimen is seven inches long, though incomplete, and is of a dark olive-green colour, with lighter tips; it is flabellately expanded, bearing segments 6–9 mm. wide when dry, 9–13.5 mm. when moist. The dichotomies are 2–4 cm. apart, the branches of each dichotomy slightly diverging above a rotundate sinus. The fertile cells are collected into irregular oblong sori scattered over both sides of the frond, leaving a bare narrow margin about 1 mm. wide. As the sori develop, linear or clavate proliferations 0.5–2 mm. long arise among the fertile cells, and, gradually increasing in number and size, cover the thallus, as in *D. nigricans*. In transverse section the thallus is seen to be composed of an interior monostromatic layer of large cubical cells enclosed by a monostromatic cortex of small coloured cells (three or four of these to each internal cell). At the margin of the thallus the internal stratum becomes polystromatic, thus forming a slightly thickened limb.

D. prolificans belongs rather to the larger and broader members of the genus than to the smaller and narrow forms. It falls into J. Agardh's subgenus *Pleiadophora*, because of its aggregated fertile

cells, but by its proliferations is well distinguished from the other members of that group. Its nearest ally (*D. navosa*) differs in having the thallus spotted with well-marked sori and no proliferations. From *D. nigricans* it differs in the position of the fertile cells, which in *D. nigricans* are scattered singly and irregularly over the surface instead of being grouped into sori.

D. DICHOTOMA Lam. Farm Cove, Sydney; in fruit, July, 1901; *A. H. S. Lucas*, no. 25. Mr. Lucas says that this is the Harbour form of the plant.

Geogr. Distr. Mediterranean, North Atlantic, Indian Ocean, North Pacific, New Zealand.

PHYLLITIS FASCIA Kuetz. Farm Cove, Sydney, July, 1901; *A. H. S. Lucas*, no. 5. "Widely distributed in the Harbour about low-tide mark."

Geogr. Distr. Mediterranean, Arctic, Atlantic, Falklands, Japan.

One of the specimens has plurilocular sporangia. This is, so far as we know, the first record of this species from Australia.

WILDEMANNIA LACINIATA De Toni. Bondi, November, 1899; *A. H. S. Lucas*, no. 21. Mr. Lucas says this is the common *Porphyra* of New South Wales.

Geogr. Distr. Mediterranean, North Atlantic.

This plant agrees in habit and structure with Harvey's specimen of *Porphyra laciniata* Ag., issued as no. 599 n of his *Alg. Exsicc. Austr.*, and collected at Kiama, New South Wales.

BRACHYCLADIA MARGINATA Schmitz. Bronte, New South Wales, November, 1903; *A. H. S. Lucas*, no. 23.

Geogr. Distr. Warm Atlantic, Indian Ocean, warm Pacific.

PTEROCLADIA CAPILLACEA Born. Farm Cove, Sydney, no. 2 Long Bay, New South Wales, no. 7. Both collected in July, 1901. Mr. Lucas says that these plants grow "in the greatest profusion in the surf on our rocky coasts, and between tides in the harbours of New South Wales. I have never been able to get cystocarps, though I have examined great numbers of specimens at all seasons. It is certainly not *G. australe* J. Ag. (*G. asperum* Harv.). No. 2 is the softer form from the harbour, no. 7 the coarser form from the ocean shores. In the Melbourne Herbarium, which, I presume, was arranged mainly by Sonder, this New South Wales form is labelled *G. corneum*."

Geogr. Distr. North Atlantic, Mediterranean, Cape of Good Hope, Indian Ocean, Japan, China, Australasia.

Mr. Lucas's plants so closely resemble numerous European specimens formerly referred to *Gelidium corneum* var. *pinnatum*, but now included by Bornet in his *Pterocladia capillacea*, that in the absence of fructification they may well be regarded as identical. Mr. Lucas's specimens are characterised by their flat, linear, branched thallus, 3-4 pinnate, with dull surface, and deep purple colour, and with branchlets flat, gradually narrowed at their base, and rounded obtuse at their apex (a portion of frond moistened is represented by fig. 4). They have not the transparent horny

appearance of *G. corneum* proper, and in all respects they agree precisely with certain Atlantic and Mediterranean specimens, nowadays referred to *Pterocladia capillacea* Born.: *Gelidium capillaceum*, from Dalmatia (*Flora Exsicc. Austro-Hungarica*, no. 2383); *G. corneum* Lamour δ *clavatum* Kuetz., from Trieste (Hohenacker's *Meeresalgen*, no. 377); *Pterocladia capillacea*, from Las Palmas, Gran Canaria (*Miss A. Vickers*); specimens from Tangier (*Schousboe*); also Desmazière's *Pl. Crypt.* ed. i. ser. i. no. 2108, and *Erb. Critt. Ital.* no. 359. A search through the genus *Gelidium* in the British Museum has enabled us to find examples of *P. capillacea*, which extend the distribution of this species to the Cape, Ceylon, China Sea, and to Australian waters. The Kew Herbarium contains a still better series; but all these exotic specimens are sterile with one exception, to which we refer below.

Monsieur E. Bornet (*Notes Algologiques*, i. 1876, pp. 57-61) was the first to recognize that the varieties *pinnatum* and *capillaceum* of *G. corneum* belong to the genus *Pterocladia*, and form a species to which he gave the name *P. capillacea*. He suggests that the poverty of British and Norman specimens has perhaps led to putting all the *Gelidia* into one species (*G. corneum*), but that whoever has studied in the Gulf of Gascony the different sorts of *Gelidium* growing together in thousands without intermingling, will have difficulty in regarding them as mere varieties; for not only do the habit and times of fructification differ in them all, but one of them at least (for the fruit of all the species is not yet known) differs clearly from the rest in the nature of its cystocarp. Like *Pterocladia lucida* J. Ag. from New Zealand and Australia, it has the placenta parietal and the spores in chaplets. It is one of the commonest forms—widespread in the Mediterranean and Atlantic Ocean—and commonly known as *G. corneum* var. *pinnata* or *capillacea*. Bornet retains the latter name as much older than the former. After describing in detail the structure of the vegetative thallus with its concealed single articulated axial filament (like that of *Caulacanthus* and *Gelidium*), and the organs of reproduction, including the clinidial cystocarp of *Pterocladia*, as contrasted with the diclinidial fruit of *Gelidium*, he states that as an exception two pericarps may occur back to back in *P. capillaceum*, separated by a partition bearing spores on both faces, and with two carpostomes; but almost always the development of placenta and spores is on one side only of the axis.

F. Ardissonne published three slightly differing schemes of classification of the Italian *Gelidia* (*Floridee Italiche*, ii. 1874, pp. 10-26, tt. 3, 4; *Enumeraz. Alghe di Liguria*, 1877, pp. 193-4, in which work Strafforello was joint author; *Phycologia Mediterranea*, i. 1883, pp. 284-92), in all of which he preferred to maintain the cautious and conservative attitude of retaining as one of the many varieties of *G. corneum* the species which we have now under discussion. In adopting this attitude he was strongly influenced by having found diclinidial cystocarps on an Australian form much akin to *G. corneum* var. *pinnatum*. We have not seen Ardissonne's Australian specimen, and, from the short description he gives of it, we are sure that it

has not the flattened thallus of our plant. Possibly it might be a form of *G. australe* J. Ag., a species that fruits freely.

We alluded above to a fruiting specimen of *Pterocladia capillacea* from Australia. It is preserved in the Kew Herbarium under the name of *Gelidium australe*, and was collected at Port Phillip Heads, Back Beach, Sorrento, Jan. 31st, 1890, by J. Bracebridge Wilson. It bears cystocarps of the *Pterocladia* type, and this is, so far as we know, the only fruiting specimen from Australia. On the same mount is a tetrasporiferous specimen, together with some sterile plants which much resemble a specimen from Kiama, New South Wales, issued as *Gelidium asperum* by Harvey under the number 333 N. This latter appears to us to be a tall lax form of *P. capillacea*, having a thin flat ribbon-like bi-tripinnate thallus, with fewer and more distant pinnae. Harvey's nos. 333 H and 333 B, which came from Western Port, Victoria, and King George's Sound respectively, and were also issued as *G. asperum*, are simply *G. australe* J. Ag.

It is much to be deplored that in De Toni's *Sylloge Algarum* the ancient and almost historic species, *G. corneum*, has been allowed to pass out of existence—a fate which, in lichenological literature, has also befallen the even more hoary and venerable lichen *Usnea barbata*. There is comfort to Israel at least in the reflection that M. Bornet maintains *G. corneum* in his *Algues de Schousboe*, 1892, as also does Mr. Batters in his recent *Catalogue of British Marine Algæ*, published as a Supplement to this Journal. We recommend the case of *Usnea barbata* to the consideration of the Committee appointed by the recent Botanical Congress at Vienna to report on cryptogamic nomenclature.

While treating of *Pterocladia* and *Gelidium*, we would take the opportunity of pointing out that, among the many species of *Gelidium* figured by Kützinger in his *Tabulæ Phycologicæ*, and not yet definitely placed in current systematic literature, there can be no doubt that his *G. cærulescens*, op. cit. xviii. p. 19, t. 56, c, d, from New Caledonia, Wagap (Vieillard), and *G. proliferum*, tom. cit. p. 19, t. 55, a, b, from the Adriatic, are synonyms of *Pterocladia capillacea*.

PTEROCLADIA LUCIDA J. Ag. Maroubra Bay, July, 1901; *A. H. S. Lucas*, nos. 8 and 9. Of no. 8, Mr. Lucas says:—"It is exceedingly common on the east coast—at all events, south of Sydney; hence it is strange that neither Harvey nor De Toni mention it from the east coast at all. Our specimens are apparently more cartilaginous and narrower in the frond than those of West or South Australia." It bears cruciate tetraspores. Of no. 9, he says:—"Only obtained from deeper water when cast up by storms. I am inclined to put it down as a deeper growing, vegetative form of *P. lucida*. As far as I can make out, the structure of the frond is similar."

Geogr. Distr. From New South Wales along the south coast to Western Australia, Tasmania, New Zealand, Lord Howe's Island, Chatham Islands.

With regard to the synonymy of *P. lucida*, we feel no doubt that the plant figured and described by Kützinger in his *Tabulæ Phycologicæ*, xviii. p. 19, t. 56, a, b, under the name of *Gelidium coral-*

linum, and collected in New Zealand by J. D. Hooker, must be referred to this species.

The deep-water form (no. 9) sent by Mr. Lucas differs markedly from the usual shrubby 3-4 pinnate form of the species. For the benefit of collectors we append the following description :—

Forma PECTINATA, f. nov. Fronde compressa anguste elongata disticha e basi pectinato-pinnata (alioqui parce ramosa ramis pectinatis) ramulos copiosos patentis lineares acuminatos inter sese spatiis latitudini eorum æqualibus separatos gerente.

The frond tends to be linear-elongate in outline, being sometimes 26 cm. long and 1.5 cm. broad, interrupted by the protrusion of a very few long branches of similar habit, which make the plant bipinnate. The numerous flat ramuli which occur with perfect regularity at short intervals along the whole of each margin of the flat rachis are normally about 1 cm. long and 1 mm. wide, but about half of them are broken off and truncate.

KALLYMENIA TASMANICA Harv. Botany Bay, June, 1903; *A. H. S. Lucas*, no. 29; with cystocarps and with tetraspores. Mr. Lucas only found it in fruit on one occasion. He has several specimens which proliferate all over their surface. Some may reach a foot in diameter. It is not very rare in Botany Bay.

Geogr. Distr. Tasmania, South Australia.

The name of this plant was first published by Harvey in Hooker's *Flora Tasmanica*, ii. 1860, p. 325. He does not describe it, but says :—"Fragments of a *Kallymenia* of large size, resembling *K. Harveyana*, are not uncommon at Georgetown, but I have as yet seen no specimen sufficiently perfect to enable me to characterize the species. One of my specimens is eighteen inches broad, about twelve inches long, broadly foliaceous, lobed and lacerate at the margin; another, of somewhat smaller size, is deeply laciniate, and divided into numerous narrow lobes and segments. There seems to be no very definite outline. There is a short stipes, soon widening into the cuneate base of the frond. The colour is a deep crimson. The substance is soft, and the plant adheres firmly to paper."

J. Agardh was the first to describe the species (*Epicrasis*, 1876, pp. 220 and 686) from a plant sent to him by Harvey. In *Till. Alg. Syst.* vi. p. 17, after receiving more material, still without fruit, he speaks of the general resemblance to *Halymenia kallymenioides* (p. 258, *infra*), and says he recognizes two forms, which he describes as follows :—

(a) *K. tasmanica*. Thinnish and closely adherent to paper, frond mostly entire or slightly lobed, margins sometimes rather sparsely undulato-plicate.

(b) *K. tasmanica* var. *laciniata*. Thicker, when dry sometimes almost cartilaginous, and scarcely adhering to paper, deeply laciniate above a certain median undivided area, lacinae cuneate-oblong or linear rather, margins vaguely dentate as though eroded.

He prefers to regard these not as two distinct species, but, until fertile specimens are forthcoming, as forms modified by environment. We have not seen authentic examples of these two forms;

but we have been able to study in the Kew Herbarium two specimens of *K. tasmanica* named by Harvey himself, and collected in Tasmania by W. Archer and R. Gunn respectively. Archer's specimen is of a thinner consistency than Gunn's plant, and bears many broad spreading irregular lobes, arising from the margin of the thallus, and having the margins here and there eroded. This specimen resembles in form, consistency, and structure the plants sent to us by Mr. Lucas. Gunn's plant, on the other hand, is smaller and thicker, and a section of its thallus shows that the interior filaments are rather coarser and more granular than those of Archer's or Mr. Lucas's specimens. Gunn's plant bears proliferations on its surface, as also does one of the specimens sent by Mr. Lucas, who, as mentioned above, says he has found plants proliferating all over their surface. The main interest, however, in the new specimens lies in the fact that Mr. Lucas has succeeded in finding a plant bearing cystocarps—a new record, so far as we know. The cystocarps are large and prominent, and occur on the surface, and occasionally on the edge of the thallus (figs. 3 and 3a). They are fairly numerous on the fragment which bears them.

RHABDONIA ROBUSTA J. Ag. var. *TENUIRAMEA* var. nov. Frons minor, e basi ramosa, ramis teneris, irregulariter bipinnatim divisis, ramellos setaceos divaricatos gerentibus.

Plant about 12 cm. high by 15 cm. wide. Branches 4–9 cm. long. Ramelli variable, 0.25–1.5 cm. long by 0.1 mm. wide (0.5 mm. wide at attenuated base).

Sandringham, Botany Bay, no. 17, with fruit; Farm Cove, Sydney, no. 26; both collected by Mr. Lucas.

Of no. 17 Mr. Lucas writes:—"I have found it both in Port Phillip and Botany Bay. The sterile fronds are abundant in company with (not growing on the same plant as) the fertile."

Geogr. Distr. Australia.

At first sight these specimens would not readily be referred to *R. robusta*, owing to their slenderness; but they have the typical structure of *Rhabdonia* in their thallus, and one of these (the mid-summer specimen) bears typical cystocarps. As to their slender habit, this does not prohibit the inclusion of Mr. Lucas's plants in the species, for in the herbarium of the British Museum there are specimens of intermediate size which form connecting-links with the normal robust state of the species. Among these is the plant from Port Jackson recorded by Harvey in *Phyc. Austr.* v. Synopsis, p. xxxvi, no. 446, as *Solieria chordalis*, being no. 345 L of his Australian Exsiccati. The numerous setaceous ramelli give Mr. Lucas's plant a much more branched and shrubby appearance than is exhibited by the type.

As regards *Solieria chordalis*, Harvey referred to this species two plants which have since been transferred to two different genera, neither of these plants representing the true *S. chordalis* of J. Agardh. One of these is recorded in his *Nereis Boreali-Americana*, ii. (1853), p. 121, tab. 23A, with a note on its resemblance to *Rhabdonia tenera*, to which species J. Agardh soon afterwards transferred it in his *Species Alg.* p. 354; later on (1889)

Schmitz made *R. tenera* the type of his new genus *Agardhiella*. Some years after his visit to America Harvey visited Australia, and obtained specimens from Port Jackson, which, as mentioned above, he also referred to *S. chordalis*. We cannot find any reference to this record in subsequent literature, but the specimens of it, which are preserved in the British Museum and the Kew Herbarium, we have no hesitation in regarding as a slender form of *Rhabdonia robusta*, as indicated above.

Gracilaria Lucasii, sp. n. Planta fruticulosa, frondibus quoquoersum ascendentibus teretibus divaricato-dichotoma et iterum iterumque ramosis, ramulis ultimis brevissimis subacutis, sæpe brevissime furcatis. Color fusco-purpurascens. Cystocarpia et tetrasporangia ignota.

Farm Cove, Sydney, July, 1901; *A. H. S. Lucas*, no. 1.

The point of attachment is wanting. The fronds are about 1.5 mm. diam. below, becoming narrower above, irregularly dichotomous, branched almost from the base. The whole plant rather stiff when dried. Mr. Lucas gives the following notes about it:—"This is very common about Port Jackson, and less common in Botany Bay. It is dark purplish brown when fresh, very brittle, contracts strongly on drying. Its branching is strongly divaricate; it grows in stiff little bushes eight to ten inches in diameter, and up to six inches high. I have never seen a Victorian or Tasmanian specimen. De Toni's description of *G. lichenoides* agrees generally, but our forms show no sign of subsecund branching." And again:—"I fancy this will turn out to be new. It is not often to be found, and I have not seen it in the Melbourne Herbarium (Sonder's). It branches in all planes, making a rounded bush. The fronds are cylindrical and not flattened, the branching is not pinnate but divaricate, and the terminal pointed segments spread in all directions. The colour is *fusco-purpurascens*, and the substance is *carnosa* enough to be extremely brittle, so that with that and the divaricate growth it is hard to press without breaking up, and is gelatinous enough for the younger portions to adhere to paper on drying. I have only found it in Port Jackson. I am on the look-out for fruit."

G. Lucasii belongs to J. Agardh's section *Plocaria*, and in structure is closely related to *G. lichenoides*, but differs from that species in having none of the usneoid habit represented in Turner's *Hist. Fuci*, tab. 113a. In the latter respect our plant is like Harvey's *Gracilaria* sp. (Friendly Islands, no. 36), but differs from it in having much thinner interior cell-walls.

G. Lucasii differs from no. 95, Harvey's *Ceylon Algæ* (*G. lichenoides*), in being compressed after drying, and purple-brown with dull rugose surface, whereas no. 95, Ceylon, has frond and branches terete and pallidescens, smooth, and usneoid-branched when dry, just like typical *G. lichenoides*.

G. TEXTORII De Toni. Botany Bay, April, 1900, with cruciate tetraspores; also February, 1905, with cystocarps; *A. H. S. Lucas*, no. 11.

When sending the first specimens of this plant, Mr. Lucas said

that he had never succeeded in finding the cystocarps, adding that he had only met with the fronds thrown up in summer and autumn. Writing subsequently on February 20th, 1905, he sent us specimens in full fruit, having found an abundance of it ten days previously in Botany Bay. He adds that the consistency of the plant is not coriaceous but carneous, and it is a very brittle plant to handle. He records the same species from Redcliffe, near Brisbane, Queensland.

Geogr. Distr. Japan, Eastern Australia.

These specimens closely resemble Suringar's figures of *Sphaerococcus* (*Rhodymenia*) *Textorii* in his *Algæ Japonicæ*, 1870, p. 36, tab. xxiii. It was also figured by Okamura (*Illustrations of the Marine Algæ of Japan*, v. (1901) tab. xxiii.), who shows sterile and fertile plants and sections of fronds with tetraspores and cystocarps respectively.

GRACILARIA sp.? Milson's Point, Port Jackson, January, 1904; *A. H. S. Lucas*, no. 16.

This plant has no fruit, and though it has the structure of *Gracilaria*, we cannot be certain that it belongs to that genus. It has very much the habit of *Gymnogongrus norvegicus*.

HYPNEA MUSCIFORMIS J. Ag. Sandringham, Botany Bay, January, 1904; *A. H. S. Lucas*, no. 19.

Geogr. Distr. Mediterranean, warm Atlantic, Indian Ocean, Pacific.

Both these plants bear tetraspores, and resemble the figure of the Mediterranean *H. Rissoana* in Kützing's *Tab. Phyc.* xviii. tab. 19. This is included by De Toni as a synonym of *H. musciformis*. The ends of the branches are not curled or even hooked, and the branchlets are short, those bearing the tetrasporangia being thick and swollen.

RHODYMENIA AUSTRALIS Harv. Sandringham, Botany Bay, January, 1904; *A. H. S. Lucas*, no. 18.

Geogr. Distr. West and South Australia.

CHYLOCLADIA GELIDIODES Harv. (? = *Chylocladia catenata* Harv., *Lomentaria catenata* J. Ag.). Farm Cove, Sydney; *A. H. S. Lucas*, no. 3. "Common on the rocks just below low water in the Harbour."

Geogr. Distr. Australia, Japan.

In the British Museum there are authentic specimens of *C. gelidioides* Harv. and *C. catenata* Harv. The former was collected by Dr. Ferd. Müller at Twofold Bay, and is described by Harvey in *Phyc. Aust.* vol. v. Synopsis, p. xlvi, no. 603. He there states that it resembles his *Chylocladia catenata* from Japan, but differs from it in "the generally alternate ramuli and the excavated sori." Now, in an authentic specimen of *C. catenata* in the British Museum, collected by Morrow and Williams in Japan, the branching is quite as alternate as that of *C. gelidioides*, and the sori are large and hollow like those of *C. gelidioides*. A specimen collected by Okamura (*Alg. Jap. Ersicc.* no. 15), and preserved in the British Museum, also shows the alternate branching. We are therefore

tempted to regard the two species as synonymous. Okamura (*Bot. Mag. Tokyo*, vol. xviii. 1904, p. 88) records *C. gelidioides* from Sydney, but with a query. He says that in his material "the branches are erecto-fastigiate and loosely intricated by coalescing to each other"; and as Harvey does not mention that character, Okamura is a little doubtful of the identity of his plants.

NITOPHYLLUM CILIOLATUM Harv. Botany Bay, July, 1902; *A. H. S. Lucas*, no. 28.

Geogr. Distr. West Australia.

Two very fine specimens.

LAURENCIA OBTUSA Lamour. Presumably from Sydney; *A. H. S. Lucas*, no. 24.

Geogr. Distr. Mediterranean, North Atlantic, Indian Ocean, Pacific, Australia, New Zealand.

DASYA CAPILLARIS Harv. Sans Souci, New South Wales, July, 1902, no. 10; also attached to *Rhodymenia australis*, Sandringham, Botany Bay, no. 18.

Mr. Lucas finds this species thrown up fairly freely in Botany Bay in winter. Writing subsequently in January, 1905, he says:—"I got this *Dasya* again this month. I found stichidia very nearly approaching those figured by Harvey (*Nereis Australis*, tab. xix.), only tapering to the long point more rapidly and on shorter pedicels. About the habit Harvey expresses doubt in the text, and certainly the figure is not a fortunate presentation of our plant."

Geogr. Distr. New South Wales, Victoria, Tasmania.

HALYMENIA KALLYMENIOIDES Harv. ? Port Jackson, no. 12; collector unknown. Mr. Lucas says:—"We have no record of the locality. It was, however, with Port Jackson material. It was very likely given to Mr. Charles Moore by Harvey."

Geogr. Distr. Western Australia.

The first description of this plant was published by Harvey in *Trans. Roy. Irish Acad.* xxii. part v. Science (1855), p. 556, founded on specimens cast up at Fremantle, West Australia. He points out that it has the habit of *Kallymenia*, but the structure of *Halymenia*, and he speaks of its glandulose margin, acute lacineæ, and scattered cystocarps. Four years later he republished the species with a new name *Halymenia? Cliftoni* in *Phyc. Austr.* 1859, tab. 103, and figured it, but without fruit, explaining in the text that satisfactory fertile specimens (presumably from Garden Island, collected by Clifton) were not received till after the plate was drawn. The old name *H. kallymenioides* was there cited as a synonym, and it was out of gratitude to Clifton, who had sent him more perfect specimens, that he altered the trivial name. J. Agardh in his *Epicrasis* (1876), p. 135, revises Harvey's conclusions, and, while maintaining the name *Halymenia kallymenioides* for the plant figured in *Phyc. Austr.* tab. 103, states that this plant was confused by Harvey with another species in the description of that plate. This second species Agardh separates under the name *Chrysomenia Cliftoni*. These species, though much alike externally, are readily distinguished by the following structural characters, according to

Agardh. The cortical cells of *H. kallymenioides* are dense and vertically arranged, while those of *C. Cliftoni* are much more scattered, and in surface view have a stellately anastomosing appearance. In the former species the infra-cortical cells are much smaller than in the latter. And the interior of *H. kallymenioides* is stuffed with numerous threads, some of them coloured and incrassate at the nodes; while in *C. Cliftoni* the threads occupying the internal vacuum appear very sparse.

J. Agardh again discusses these plants in his *Till. Alg. Syst.* pt. vi. pp. 8-11, and, *inter alia*, draws attention to certain peculiar coloured solidescient or granular nodes which sometimes occur sparsely among the medullary filaments of *H. kallymenioides*. These peculiar nodes also characterize his subgenus *Sebdenia*, in which accordingly he places *H. kallymenioides*. *Sebdenia* has since been raised to generic rank, and is maintained as a genus by De Toni in his *Sylloge Algarum*, vol. iv. 1900, p. 530. In that work (p. 533) both the species under discussion find themselves together again, and ranged side by side under *Sebdenia*, but with some doubt.

GRATELOUPIA FILICINA Ag. var. LUXURIANS, var. nov. Fronde cartilaginea, permagna, cystocarpiis numerosis, præcipue in medio frondis necnon in pinnis majoribus dispositis.

Farm Cove, Sydney, July, 1901; *A. H. S. Lucas*, no. 6. "It is very common in the Harbour, just below low tide mark."

Fronds up to 22 cm. long, 3-6 mm. wide, linear, attenuated at base and apex, undivided, but bearing marginal pinnæ throughout its whole length except towards the nude apex and occasional proliferations from the surface. Median pinnæ 7.5-9.0 cm. long, and themselves bearing pinnules up to 1 cm. long; upper and lower pinnæ gradually diminishing in length towards apex and base of frond, all attenuate at their base and apex, and scarcely exceeding 2.5 mm. in width when dry. Cystocarps numerous and approximated, immersed principally in the frond, but spreading also on to the larger pinnæ up to 0.5-2.0 cm. above their base. Colour reddish purple when dry. Substance cartilaginous, scarcely adhering to paper.

This is the finest specimen of *Grateloupia filicina* that we have ever seen, and, though in that species the cystocarps are normally confined to the lateral pinnæ, we do not feel justified in making a new species of Mr. Lucas's plant on such points as its luxuriant habit and the occurrence of the cystocarps on both pinnæ and frond. In the British Museum there are intermediate specimens that connect Mr. Lucas's plant with the normal Atlantic form of *G. filicina*. One of these is no. 32 of Okamura's *Algæ Japonicæ Exsicc.*, which approaches our plant in size, but is thinner, adheres closely to paper, and, though its cystocarps occur principally on the lateral branches, some of them have spread on to the main frond. Again, a specimen sent by Mr. Tyson from Sea Point, Cape of Good Hope, is similar in dimensions, but sterile, and having been crushed on its mount adheres very closely to the paper. Other Cape specimens collected by Harvey and not crushed have a consistency like that

of our plant. Again, some of the Mediterranean specimens from Marseilles and Naples approach ours in size and habit.

Grateloupia prolongata J. Ag., as represented by Ferguson's *Ceylon Algæ*, no. 2 (but not by Kützinger's *Tab. Phyc.* xvii. tab. 24), resembles our plant in its horny consistency and the position of the cystocarps on frond and pinnæ, but differs in having pinnæ long and short intermixed and fewer in number.

GRATELOUPIA AUSTRALIS J. Ag. apud Bracebridge Wilson in *Proc. Roy. Soc. Victoria*, iv. pt. ii. 1892, p. 184 (nomen tantum).

Farm Cove, Sydney, July, 1901, no. 4, midwinter form with fruit and sterile; Milson's Point, Port Jackson, January, 1904, no. 13, midsummer form with fruit and sterile. Both were collected by Mr. Lucas, who says:—"You will notice the two fruiting seasons, in dead midwinter and high midsummer. I have only obtained it as yet from the rocks in Sydney Harbour below low-water mark or thereabouts."

Geogr. Distr. Port Phillip.

This species was collected by J. Bracebridge Wilson at Port Phillip in 1885, 1887, 1892, and 1893, and its name, given to it by J. Agardh in 1886, was published in Mr. Wilson's List in November, 1892, but apparently has never been described. We have therefore endeavoured to compile from Mr. Wilson's diversiform material in the British Museum a description of Agardh's species, as follows:—*Frondibus breviter cuneatim stipitatis simplicibus vel e fronde adultiore palmatim egredientibus vel prolificantibus vel omnino irregulariter lobatis, carnosio-membranaceis, planis, late lanceolatis vel oblongis, apice obtusis vel acutis vel acuminatis, margine sæpe subundulato hinc illinc prolificante. Cystocarpia desunt.*

Agardh's specimens appear to be most nearly allied to *G. Cutleriæ* Kütz., from the Pacific shores of South America, being somewhat similar in structure, and even in habit, but the fronds in Agardh's species are much more irregularly divided, and never have the linear elongate outline often assumed by *G. Cutleriæ*, nor such long narrow proliferations as are depicted by Kützinger in *Tab. Phyc.* xvii. tt. 35, 36; moreover the proliferations are much less frequent and more locally restricted on the thalline margin. Bracebridge Wilson's four specimens are so different in outline from one another that it is difficult to combine them in one description. The largest of them is about 25 cm. long, and about 5 cm. wide, but one short frond is 14 cm. wide.

Mr. Lucas's specimens, which we carefully disregarded when drawing up the above description, are much more divided than the type-plants, and are still more diversiform. They bear plentiful proliferations of all sizes, and rarely maintain an entire margin. It is difficult to recognize any tangible difference between the midwinter and midsummer forms. The fruits occur at both these seasons, and are copiously scattered over the surface of the thallus. We do not know whether Agardh had any fruiting material. The gelatinous substance of the thallus quickly swells up in water, and so adds to the difficulty of making careful comparisons of the structure to be observed in transverse sections; but the structure

of the plants of both Bracebridge Wilson and Mr. Lucas appears to agree closely with that of *G. Cutleriæ* Kütz.

CORALLINA RUBENS L. In rock pools; Barwon Heads, Victoria, January, 1903; *A. H. S. Lucas*, no. 15. Overgrown by *Calothrix æruginea*.

Geogr. Distr. Mediterranean, Atlantic, Indian Ocean, Cape of Good Hope.

C. CHILENSIS Decaisne. Farm Cove, Sydney, July, 1901; *A. H. S. Lucas*, no. 25. Attached to *Dictyota dichotoma*.

Geogr. Distr. Chili, Port Famine, Norfolk Island, Japan.

EXPLANATION OF PLATE 481.

1. *Dictyota nigricans* J. Ag. Portion of fertile frond in surface view, showing the proliferations and the scattered arrangement of the fertile cells, $\times 35$.

2. *Dictyota prolificans*, sp. n. Portion of fertile frond, dry, nat. size; 2a, portion of frond moistened, and half as wide again as when dry, nat. size,—on both these the bare margin and copious proliferations are obvious; 2b, part of transverse section of thallus, showing the large internal and small cortical cells both monostromatically arranged, the internal stratum becoming polystromatic at the margin, $\times 35$; 2c, portion of fertile frond, surface view, showing the fertile cells closely grouped into a sorus and interrupted by a few proliferations, $\times 35$.

3. *Kallymenia tasmanica* Harv. Small fragment of plant bearing cystocarps, nat. size; 3a, transverse section of cystocarp, $\times 25$,—both of these are figured from Mr. Lucas's material; 3b, transverse section of thallus of authentic specimen (Harvey, *Exsicc. Austral.* no. 4181), $\times 110$.

4. *Pterocladia capillacea* Born. Portion of frond moistened, nat. size.

CHARNWOOD FOREST RUBI.

BY A. BRUCE JACKSON.

IN my notes on Leicestershire plants (*Journ. Bot.* 1904, 337) I purposely omitted all Rubi records, in view of a paper devoted exclusively to the bramble forms of the county, and dealing more especially with those of the Charnwood Forest area, the headquarters of this prickly genus in Leicestershire. During recent years our more interesting bramble neighbourhoods, such as Ulverscroft and Swithland Wood, have been explored by the Rev. W. M. Rogers and Rev. E. F. Linton, who have pointed out many interesting bushes. But for Mr. Rogers's generous help in many ways, this review, largely, I fear, a compilation, could not have been attempted. He has examined all, or nearly all, the specimens of Rubi preserved in the herbarium of the Leicester Literary and Philosophical Society, and it is upon this material that the subjoined notes upon recent field work are based.

I should like to take this opportunity of acknowledging my indebtedness to my lamented friend the Rev. T. A. Preston, Mr. A. R. Horwood, Mr. Theodore E. Routh, and Mr. W. Bell for much help in the preparation of this paper. Coleman's MS. Flora of

Leicestershire, dated 1852, contained records of thirty-two *Rubi*, and these were printed in the later flora of the county, published in 1886. The number of species and varieties noted up to the end of last season (1905) was about seventy, so that as regards North England, Leicestershire stands second only to Stafford in the number of its bramble forms.

RUBUS IDÆUS L. Widely distributed in Leicestershire, and now recorded from all the districts.

R. SUBERECTUS Anders. Lane between Ulverscroft and Stonywell Wood, 1896, *Mott*. Very rare in Leicestershire.

R. PLICATUS W. & N. Mr. Rogers found what he believes to be an immature form of this in a field near Ulverscroft in 1899, but mature stem-pieces are desirable. It seems that little reliance can be placed on either the *plicatus* and *nitidus* records of Bloxam and Coleman, judging from their specimens so named.

R. CARPINIFOLIUS W. & N. Ulverscroft Lane, near Aspen, *W. M. R.* The only definite station in the county. Much of Bloxam's *carpinifolius* was certainly *pulcherrimus* Neum.

R. INCURVATUS Bab. Fox-covert near Billesdon Coplow, 1904, *Horwood*. "Apparently a shade-grown form of the strong Derbyshire plant referred to in my *Handbook*" (*Rogers in litt.*). Fenny Hill, near Belton, 1904, *Routh*. Also identical with Derbyshire specimens so named by Mr. Rogers, and suggesting *R. Colemanii* in armature.

R. LINDLEIANUS Lees. Cropston, Buddon Wood; a form with unusually ovate leaves placed under this species by Mr. Linton. Ulverscroft; Billesdon Coplow; Bagworth; very fine and characteristic in the Castle Donington district, as at Belton Asplands, Piper Wood, and Worthington; Swannington; Sinope.

R. DURESCENS W. R. L. One or two bushes of this very rare bramble were found by Mr. Rogers on rough ground near South Wood, Ashby-de-la-Zouch, in 1902, associated with commoner species. It differs slightly from the Derbyshire plant. In 1903 Mr. Routh and I found abundant and characteristic bushes of it in a lane near Packington; since seen in fruit at Woodhouse, and on Rothley Plain. Will probably prove to be not uncommon in the forest district. Previously known only from South and Mid Derbyshire.

R. RHAMNIFOLIUS W. & N. Fox-covert near Billesdon; a small-leaved form. Swithland Wood; Lea Lane; Ulverscroft; Woodhouse Eaves.—Subsp. *Bakeri* F. A. Lees. Sparingly in a lane between Hemington and Diseworth, 1903. Mr. Routh has been unable to find this again, although he has made a careful search for it.

R. PULCHERRIMUS Neum. Billesdon; Groby Pool; Rothley Plain; Lea Lane (form with flowers nearly white). Ulverscroft; a glandular form. Boothorpe Lane, Swannington.

R. LINDEBERGHII. Lea Lane, 1897, *E. F. Linton*. Ulverscroft Lane; Blackbird's Nest; waste ground near South Wood, Ashby.

R. VILLICAULIS Koehl., subsp. *Selmeri* (Lindeb.) (*R. affinis* Blox.). Frequent in Charnwood Forest, as at Martinshaw Wood. Lea Lane; Woodhouse Eaves; Lount Wood (uncharacteristic specimens).—Subsp. *calvatus* Blox. Ulverscroft Lane; Swithland Wood. Mr. Rogers says of this: "I think a woodland form of *R. calvatus* Blox., though differing somewhat in the very hairy stem, leaf-toothing, and the narrow drooping panicle from the usual plant." Bardon Hill Wood. Mr. Rogers points out that Bloxam not unfrequently gave this name to *R. Selmeri* (which, however, he oftener named *R. affinis*). But probably, of course, most of his and Coleman's *calvatus* was the true plant.

R. THYRSOIDEUS Wimm. Birstal Gorse, a stout form; Barkby. Frequent in the low country near Kegworth; Boothorpe Lane, Stony Stanton. Seems generally distributed in Leicestershire.

R. RUSTICANUS Merc. Common all over the county, especially in the immediate neighbourhood of Leicester, where the other groups, with the exception of the Cæsians, are unrepresented.

R. MACROPHYLLUS W. & N. Near Roecliffe; Piper Wood.—Subsp. *Schlechtendalii* (Weihe). Near Billesdon Coplow; near Ingarsby Station; Hall Gates; Swithland Wood; Tugby Wood.

R. SALTERI Bab. Very local. Lea Lane; Ulverscroft; outside Swithland Wood; lane near Blackbird's Nest, but somewhat untypical in having the fruiting sepals patent instead of clasping. Waste ground near South Wood.

R. SPRENGELII Weihe. Waste ground near South Wood; Boothorpe Lane, Nailstone; Wiggs.

R. HIRTIFOLIUS Muell. & Wirtg. A robust looking plant occurring in a lane near Swithland Wood is placed under *hirtifolius* by Mr. Rogers, who considers it nearer var. *danicus* Focke, than *mollissimus*, though in foliage making some advance towards the latter.—Var. *mollissimus* Rogers. Newtown Linford to Lea Lane, Ulverscroft.—Var. *danicus* Focke. Lea Lane.

R. PYRAMIDALIS Kaltenb. Rothley Plain; Lea Lane; Swithland Wood; lane at Nanpanton; near Roecliffe. Form *Eifeliensis* Wirtg. Swithland Wood; Rothley Plain, with unusually thin leaves; Martinshaw Wood. Mr. Rogers says the earlier Leicestershire records of *R. villicaulis* W. & N. are most probably all *R. pyramidalis*, which seems invariably to have been named *R. villicaulis* in England then.

R. LEUCOSTACHYS Schleich. Generally distributed in the Charnwood Forest and Castle Donington districts. On the mountain limestone at Breedon Cloud quarries both pink and white flowered forms occur.

R. CRINIGER Linton. Breech Hill, near Ashby-de-la-Zouch, 1850, *A. Bloxam* teste Rogers. Griffy Dam, 1903, *Routh*.

R. CINEROSUS Rogers. Swithland Wood, *W. M. R.* "I think rightly placed under my *R. cinerosus*, though the stem is almost quite eglandular and not aciculate, a peculiarity (occasional) characteristic of the *Egregii*. The panicle is typical" (Rogers *in litt.*). First found in 1902.

R. MUCRONATUS Blox. Swithland Wood, 1897, *E. F. Linton*: Buddon Wood; Ulverscroft.

R. GELERTII Frider. Blackbird's Nest, near the Outwoods, 1898, *E. F. Linton*.

R. ANGLOSAXONICUS Gelert. Ulverscroft, 1899, *W. M. R.* Near Rothley Station I showed Mr. Rogers a bush, which he thinks may be intermediate between *R. Salteri* and this species, but in the absence of satisfactory material he could not certainly assign it to either.—Subsp. *setulosus* Rogers. Under this name Mr. Rogers places three separate forms occurring on the Charnwood Forest border. One gathered by him in Swithland Wood in 1902 he considers all but identical with the common Herefordshire plant, from which the description was drawn up. Another form, somewhat characteristic of the *Radulæ*, was seen by me near Woodhouse in 1903. Ulverscroft; a form less typical in its hairy stem. Lea Lane; form approaching var. *raduloides*. A form similar to the Ulverscroft plant was gathered near Pit Lane, Swithland.

R. LEYANUS Rogers. Lea Lane, 1898, *E. F. Linton*. Ulverscroft Lane; a rather weak subglabrous form. Mr. Rogers says that a bramble collected at Martynshaw Wood in September, 1905, by Mr. Horwood recalls *R. Leyanus*, but the material is too imperfect for certain determination.

R. RADULA Weihe. Glen Gorse; Six Hills; Blackbird's Nest; Newtown Linford to Lea Lane; Swithland. — Subsp. *anglicanus* Rogers. Hill near Lowesby Station; "somewhat shade-grown and uncharacteristic," *W. M. R.* A frequent plant in the Charnwood area. Quarry, Mountsorrel; lane bordering Buddon Wood; opposite Quorn House; Quorn Park; Swithland Wood, with the stem more hairy than usual; Blackbird's Nest; near Ashby-de-la-Zouch.—Subsp. *echinatoides* Rogers. Lane near Gelscoe.

R. ECHINATUS Lindl. Swithland Wood; Hall Gates; Woodhouse Eaves; Blackbird's Nest; lane by Buddon Wood; Newbould; Lount Wood; Belton; Hoo Ash; Blackfordby; Sinope; near Billesdon Coplow, forma *umbrosissima*.

R. OIGOCLADOS Muell. & Lefv. var. *Bloxamianus* Coleman. Generally distributed in the forest district, where it keeps remarkably distinct. Long Spinney, Scraftoft; Syston; Swithland Wood; Rothley Plain, a weak form; Cropston; Thurcaston; Ulverscroft; Roecliffe; Lea Lane; Piper Wood; Lount Wood; roadside, Altons; near Blackfordby, but uncharacteristic; Sinope; Billesdon Coplow, shade-grown form; Owston Wood; hill above Lowesby Station.

R. RUDIS W. & N. Owston Wood, 1901, *Jackson*; Knighton Spinney, with leaflets remarkably roundish; Glen Gorse. The earlier records of this from Charnwood Forest and other parts of the county were probably chiefly *R. echinatus*, but Mr. Rogers points out that Mr. Mason's herbarium at Burton-on-Trent contains one sheet of Bloxam's from Leicestershire, which is probably the true plant.

R. GRIFFITHIANUS Rogers. Seen by Mr. Rogers at Breedon, and plentifully in Lount Wood, a neighbouring locality, in 1902. The specimens exactly match the Carnarvon plant, previously known only from Carnarvon and North Devon.

R. BABINGTONII Bell Salter. Under trees by roadside near Bardon Hill, 1901, *Jackson*. "This may very probably be a shade-grown form of *R. Babingtonii*, but if so it is distinctly off type in both panicle and stem-leaves, but I see no other name to suggest,"

W. M. R. A plant between type and the var. *phyllothyrsus*, but on the whole nearer to the variety, was seen at Ulverscroft.—Forma *umbrosa*. Copse near Rothley Station.

R. BLOXAMI Lees. Burbage Wood, 1898, *Jackson*.

R. SCABER W. & N. Blakeshay Wood, 1898, *E. F. Linton*.

R. FUSCUS, W. & N. Rev. E. F. Linton considers that a plant which he gathered in Lea Lane in 1898 should bear this name, but Mr. Rogers considers it doubtful.—Var. *nutans* Rogers. Lea Lane, 1898, *E. F. Linton*.

R. PALLIDUS W. & N. Swithland Wood, 1898, *Linton*. The only known Leicestershire locality. The Bloxam and Coleman records of this probably referred to *R. dasyphyllus* Rogers.

R. FOLIOSUS W. & N. Buddon Wood; Swithland Wood.

R. ROSACEUS W. & N. Scraptoft Long Spinney; Lea Lane; Buddon Wood; Blackbird's Nest.—Subsp. *infecundus* Rogers. Piper Wood, 1902, *Rogers*. Boothorpe Lane; Shepshed Lane, Newtown Linford—a form with zigzag panicle rachis; Sutton Ambien, *W. Bell*.—Var. *hystrix* W. & N. Pocketgate, Charnwood Forest—panicle abnormal; Ulverscroft Lane.

R. KÖHLERI W. & N. Near Roecliffe, 1899, *Rogers*.—Subsp. *dasyphyllus* Rogers. Abundant in the Charnwood Forest area; also seen near Old Humberstone. A shade-grown form of it with weaker armature occurs in a copse near Braunstone, Leicester, and a gathering from the Long Spinney, Scraptoft, was named forma *umbrosa* by Mr. Rogers.

R. BELLARDII W. & N. Tugby Wood, 1903, *W. Bell*.

R. HIRTUS Waldst. & Kit., subsp. *Kaltenbachii* (Metsch.). Very fine and luxuriant in lane bordering Buddon Wood, 1899, *Jackson*.

R. SAXICOLUS P. J. Muell. var. *horridicaulis* P. J. M. Mr. Rogers considered a bush which he saw in Wood Lane, Quorn, in 1902, to be the same as the Brecon and Glamorgan bramble so named by Dr. Focke. I could not find the plant last year, though I carefully searched the lane from Buddon Wood to Rothley Plain.

R. OCHRODERMIS A. Ley. Lane by Buddon Wood, 1902, *Rogers*. "Cannot. I think, be kept from *R. ochrodermis*, though with stem more hairy and less armed than is usual in the west," *W. M. R.*

R. VELATUS Lefv. Near the railway-station, Quorn, 1899, *Rogers*.

R. DUMETORUM Weihe, sp. coll. Widely distributed in Leicestershire.—Var. *ferox* Weihe. Cropston Lane; Swithland Wood; Rothley Plain; Newtown Linford and Lea Lane; Ansley; Birstal;

Woodhouse Eaves; Sileby; Farm Town; near Altons, Ashby; Sinope; Loddington, near the canal; Horninghold; East Norton.—Var. *britannicus* (Rogers). Sutton Ambien, *Bell.*—Var. *diversifolius* (Lindl.). Glen Gorse; Cropston; Thurcaston; Swithland.—Var. *tuberculatus* Bab. Boothorpe Lane; between Sutton Cheney and Ambien Wood.—Var. *fasciculatus* (P. J. M.). Near Quorn; field by Quorn Wood.

R. CORYLIFOLIUS Sm. Common in hedges, associated with other *cæsians*.—Var. *cyclophyllus* (Lindb.). Newstead Road, Knighton; Blaby; Birstal Gorse; Thurcaston; East Norton.—Var. *concinus* Warren. A form of this was seen on the red marl at East Norton.

R. BALFOURIANUS Blox. Mr. Rogers so names a bramble collected at Sutton Ambien Wood in July, 1904, but says that better specimens are desirable.

R. CÆSIUS L. Hedges and damp woods, often hybridizing with other *Cæsians*.

BRITISH CÆNOGONIACEÆ

By A. LORRAIN SMITH, F.L.S.

STUDENTS of cryptogamic botany, more especially field workers, are probably familiar with a dark-coloured, finely filamentous, creeping plant, found in moist shady localities spreading over rocks and stones, sometimes in small patches, sometimes covering a fairly large area with its felt-like growth. No fructification has ever been found in connection with this plant, and so it has been shifted about from one group to another of the vegetable kingdom, and variously classified by systematists as alga, fungus, or lichen, and recorded as *Byssus nigra*, *Cystocoleus ebeneus*, or *Racodium rupestre*. A more exact knowledge of the composition of plants has led to the recognition of two distinct forms under these names, very similar in appearance and habitat, both sterile, and both lichens—in the one case *Racodium*, containing the algal constituent *Cladophora*; in the other *Cænogonium*, in which the alga is *Chroolepus* (= *Trentepohlia*).

In the recently published fascicle 221 of Engler's *Pflanzenfamilien*, Dr. Zahlbrückner has included these two genera of lichens in the family *Cænogoniaceæ*. The two plants are easily distinguished under the microscope; in *Racodium* the investing fungus lies in straight unbranching lines along the *Cladophora* filament, while in *Cænogonium* the dark fungal hyphæ branch repeatedly, and wind round the irregular bulging cells of the alga, *Chroolepus aureus*.

In his "Notes sur le genre *Trentepohlia*" (*Journ. de Bot.* iv. p. 91, 1890), P. Hariot excludes "*Chroolepus ebeneus*" (= *Cystocoleus ebeneus*) from the genus *Trentepohlia*. He recognizes the composite nature of the plant, "un *Trentepohlia* (*T. aurea*!) recouvert par des hyphes noirs de nature fungique." He also records, as identical with it, Persoon's *Racodium rupestre*, basing his statement on an examination of the specimen no. 400 in Mougeot & Nestler's *Stirpes-Vogeso-*

Rhenanæ (1815). It is characteristic of these two plants, to find that they are both present in the specimen cited, though the *Cænogonium* is the predominant form of the specimen in the possession of the British Museum. De Bary also reviews the plant in his *Morphol. of the Fungi*, p. 44 (Eng. transl.). He regards *Cystocoleus* of Thwaites as synonymous with *Racodium rupestre* Pers., but correctly describes it as associated with *Chroolepus*.

The two plants have been constantly confused in the different herbaria, and can only be safely distinguished under the microscope. On examining the various British forms of *Byssus*, *Racodium*, &c., in the National Herbarium, I have found that most of the plants are allied with *Chroolepus*, and therefore to be classified under *Cænogonium*. Only one specimen, collected by Larbalestier at Kylemore, in the West of Ireland, is *Racodium rupestre*. I have also had the opportunity of examining the forms of *R. rupestre* in Leighton's herbarium, now preserved at Kew. Two of these are undoubtedly *Racodium rupestre*; they were collected at Aran Mawddwy, in North Wales, by Leighton, and at Cleveland, in Yorkshire, by W. Mudd. The other specimens collected by Leighton in Shropshire and near Conway belong to *Cænogonium*.

The genus *Cænogonium* was founded by Ehrenberg in 1820 (*Horæ Physicæ Berolinensis*, p. 120) on a species *C. Linkii*, from Central America. It is mainly a tropical genus, and almost all the species are brightly coloured. Ehrenberg describes the loosely-growing filaments of the thallus and the apothecial fruits. The only species hitherto recorded from Europe as a *Cænogonium* was found by Hugo Glück in Saxony and the Harz (*Flora*, lxxxii. p. 268 (1896)). It grew abundantly on a siliceous substratum, and attained a considerable size—in one instance it extended $1\frac{1}{2}$ metres. Glück describes it as forming a black soft felt of fine much-branched filaments, which vary in length according to the dampness of the locality. There was no fructification, and occasionally it was overgrown by the white sterile thallus of another lichen, probably a species of *Lepraria*. Glück named the species, which he considered a new discovery, *Cænogonium germanicum*. He gives drawings and a full description of the plant; the filaments are constricted at intervals, each constriction representing a cell of the imprisoned *Chroolepus*, the characteristic oil-drops being plainly visible through the dark hyphal investment.

In Ann. Mag. Nat. Hist. 1869, p. 241, G. H. K. Thwaites published a new genus *Cystocoleus*, to contain a form of *Byssus nigra*, also called *Chroolepus ebenus*. His descriptions and drawings leave no doubt he was dealing with the species afterwards discovered in Germany. Glück knew of his work, but had misunderstood the description; he dismisses it as being symbiotic with *Cladophora*, and therefore not a *Cænogonium*, and not the German plant. Thwaites had distinctly noted the likeness to *Chroolepus*: "The internal filament, which in structure and character closely resembles the filaments of *Chroolepus*, protrudes beyond the investing sheath, and may then be seen to consist of oblong cells containing the peculiar reddish, oily-looking endochrome of *Chroolepus*." No dimensions

are given; he only makes the statement that he had been "fortunate enough to meet with good specimens."

My attention was drawn to the subject by my being fortunate enough to find a good specimen of *Byssus nigra*. It covered a piece of worked sandstone in a damp shady locality in Dumfriesshire, with a close spreading black felt at least half a yard in extent, and with a very irregular outline. It also was invaded by a whitish *Lepraria*. Microscopic examination showed the *Chroolepus* cells, containing the large orange globules, invested by the dark filaments. It would have been satisfactory to follow up Thwaites's careful work, and call it *Cænogonium ebeneum*; but Glück carries priority with *C. germanicum*. In addition to the Scotch locality, I have found odd filaments of the same plant associated with *Chroolepus aureus* in specimens of the alga collected at Llanwymawddwy in North Wales, and in Devonshire. We have also Leighton's plants from Conway and from Shropshire, indicating a widespread distribution. Our native *Cænogoniaceæ* are therefore represented by the two genera and species: *Racodium rupestre* Pers. and *Cænogonium germanicum* Glück.

Glück found a species of *Trentepohlia* (*Chroolepus*) growing in the neighbourhood of his lichen, which he recognizes to be the same as the algal symbiont of the *Cænogonium*. He considers it also to be new, and names it *T. germanicum*. My contention that his plant is the *Cystocoleus ebeneus* Thwaites—the *Chroolepus ebeneus* Ag.—leads also to the acceptance of the alga as *Trentepohlia aurea*, which is a very variable plant, in the branching of the filaments, and in the size of the cells.

The following series of measurements show at a glance the variation in the individual plants, and the general similarity between the different specimens examined. In each case the measurement is given of the width of the entire filament:—

<i>Cænogonium germanicum</i> (Germany)	...	11–28 μ .
" " (Dumfriesshire)		12–25 μ .
Mougeot & Nesler's specimen, no. 400		10–20 μ .
Leighton's specimen from Conway	...	11–25 μ .
" " Shropshire		8–18 μ .

Thwaites does not give measurements, but his magnifications give a size very similar to Glück's drawings of the German plant. The main filaments are in each case stouter than the branches.

SILENE BELLA E. D. CLARKE.

By JAMES BRITTEN, F.L.S.

In the *Index Kewensis* (where the authority is spelt "Clark") this is given as a synonym of *S. compacta*, "Fisch. Hort. Gorenk. ed. 2 (1812), 60; et ex Hornem. Hort. Hafn. i. 417." If the identification be correct, as it appears to be, it is Clarke's name that must stand, as it dates from 1810; in Fischer's *Catalogue du*

Jardin . . . à Gorenki the name only appears, and that apparently as a synonym of *S. Armeria*, with which it is bracketed, and Hornemann's description dates from 1815.

S. bella has apparently dropped out of sight; it is not mentioned by Rohrbach in his monograph on *Silene*, nor by Mr. F. N. Williams in his revision of the genus in *Journ. Linn. Soc.* xxxii. 1-196. It may be well therefore to reprint Clarke's diagnosis, as given in Appendix V.—“List of the plants collected by the author during his different journies in the Crimea, principally in company with his friend Professor Pallas”—to his *Travels* (i. 746). It runs: “*Silene bella* (nova species) *Silene* caule decumbente ramoso, ramis glabriusculis, foliis lanceolatis glabris trinerviis; floribus fasciculatis [*sic*] terminalibus, calycibus striatis pilosiusculis; longissimis; petalis integris.” Hornemann's description is: “*S. compacta* Fisch.: floribus fasciculatis, petalis integris, foliis acutis glabris, superioribus ovato-lanceolatis, inferioribus oblongo-lanceolatis. Hab. in Russia? D. intr. 1812. *S. Armeria* duplo major.”

Rohrbach cites as a synonym of *S. compacta*, “*S. orientalis* Mill. ex *Wochenschr. f. Gärtnerei u. Pflanzenkunde*, 1858, 110.” *S. orientalis* Mill. (*Dict.* ed. 8, no. 10) is ignored by Williams, and is not taken up by Boissier, who seems to have been unacquainted with Clarke's book; the name appears in the *Index Kewensis*, but is not correlated. From Miller's description it would appear that it can have nothing to do with *S. compacta*. He says, “calycibus conicis striis hirsutis fructibus erectioribus, caule erecto hirsuto, foliis nervosis”; and cites as a synonym, “*Lychnis Orientalis*, longifolia nervosa, flore purpurascens. *Tourn. Cor.* 24.” There is in the National Herbarium a sheet, I think from Miller's herbarium, of *S. conoidea*, on which is written “*Silene orientalis*?? Mill. *Dict.*,” and also a specimen from Chelsea Garden of the plant cultivated there in 1723 under the Tournefortian name above cited, which is *S. noctiflora*. Miller also describes each of these, but the same plant is sometimes twice described by him under different names. Anyway the description is sufficient to exclude *S. compacta*.

The synonymy of the species seems to be:—

SILENE BELLA E. D. Clarke, *Travels*, i. 746 (1810).

S. compacta Fisch. *Cat. Jard. Gorenk.* ed. 2, 60 (1812), *nomen*; et ex Hornemann, *Hort. Hafn.* i. 417 (1815); Rohrbach, *Monogr. Silene*, 150 (1868), *excl. syn.* Mill.; Williams in *Journ. Linn. Soc.* xxxii. 109 (1896).

It may perhaps be suggested that monographers should endeavour, as far as possible, to account for every name given in the *Index Kewensis* for the group with which they are concerned. In the present instance, if *S. bella* had been looked up, its date and synonymy would have been ascertained, its retention would have followed, and this note need not have been written.

THE FLORA OF CYPRUS.

BY HAROLD STUART THOMPSON, F.L.S.

A COLLECTION of about three hundred flowering plants made in Cyprus in 1900, 1901, and 1902 by Mr. A. G. and Miss M. E. Lascelles was presented to Kew, and in 1904 I compared and named the specimens under Dr. Stapf's supervision. It comprised at least forty-four species hitherto unrecorded from the island, and a considerably larger number which were not recorded from Cyprus in Boissier's *Flora Orientalis* (1867-1884), and the Supplement of 1888.

Several of the new plants in the Lascelles' collection also appeared in a small collection of about one hundred and forty species, made in Cyprus, in 1904, by Miss E. A. Samson, which I subsequently examined; and Miss Samson added two more species (weeds of cultivation) new to the island, viz. *Silene Gallica* L. and *Chenopodium rubrum* L. She also gathered *Phlomis lunarifolia* Sibth. & Smith, which, though recorded by Drs. Unger and Kotschy (*Die Insel Cypern*, p. 275), from near Chrysoku, in Cyprus, is a plant which has been little understood and much confused with other species since its publication by Sibthorp and Smith in their *Prodromus Floræ Græcæ* in 1806.*

It may be useful to give a few facts about the topography, climate, and physical features of the island of Cyprus, and upon its vegetation generally; and also to give a brief sketch of its botanical history and bibliography.

Passing over the earlier travellers, who spent little time in the island, and paid comparatively little attention to plants, it may be said that the first contribution of importance to a knowledge of the flora was the outcome of Sibthorp's visit in 1787. Sibthorp was accompanied by the celebrated botanical artist Ferdinand Bauer, and, although they remained on the island only from April 8th to May 13th, a considerable number of the beautiful plates of the *Flora Græcæ* represent Cyprian plants. However, the total number of flowering plants and ferns recorded from the island in the *Flora Græcæ* and the *Floræ Græcæ Prodromus* together did not exceed three hundred and thirteen species. Two hundred and four genera and three hundred and thirty species of phanerogams were recorded in 1842 by Joseph Poesch in his *Enumeratio Plantarum hucusque cognitarum Insulæ Cypri*, an octavo pamphlet of forty-two pages, published at Vienna.

But we must turn to the comprehensive work on the natural history of the island by Unger and Kotschy—*Die Insel Cypern* (1865)—for anything approaching a complete list of the known plants. About one thousand and forty-five species of phanerogams and vascular cryptogams were enumerated, but, if we exclude doubtful species and certain cultivated plants included by Unger and Kotschy, probably there would remain only about one thousand

* See *Annals of Botany*, xiv. 439.

good species. Boissier recorded six hundred and twelve species of phanerogams and vascular cryptogams from Cyprus in his *Flora Orientalis* and Supplement, 1888, but to-day there are at least eleven hundred and seventy, excluding plants of probable garden origin, and some others recorded by Unger and Kotschy. The present paper gives a list of these additions.

A very interesting summary of the contents of Unger and Kotschy's book, by Mr. W. B. Hemsley, appeared in the *Gardeners' Chronicle* for 1878 (vol. x. pp. 75, 107, 183). I have made free use of Mr. Hemsley's paper, and of other papers and MS. notes he kindly placed before me when I was working in the Kew Herbarium. My thanks are also due to Mr. R. A. Rolfe for naming the orchids in the Lascelles and Samson collections.

Since the British occupation, commencing in 1878, several persons have collected plants in Cyprus, and Mr. Paul Sintenis, a German botanist, and Mr. Rigo made a journey from Larnaka across the island to Pentadactylon, and eastward through the northern range of mountains to Cape Andreas. A somewhat diffuse account of this journey (Feb. 17th to April 28th, 1881) runs through two volumes (1881 and 1882) of the *Österreichische Botanische Zeitschrift*, but it was not completed, and there is no summary and no means of easily ascertaining whether any important discoveries were made, or what was the extent of the collection. About a dozen species of their collecting are described as new in Boissier's *Flora Orientalis, Supplementum* (1888).

The most recent list of new Cyprus plants is that of the Rev. George E. Post, entitled *Plantæ Postianæ*, in the *Bulletin de l'Herbier Boissier* for 1897, p. 755; 1899, p. 146; and in the *Mémoires de l'Herbier Boissier* for 1900, p. 89. These lists comprise plants from other places in the Orient, but the Cyprian species are enumerated only in the years quoted above, and the great majority in 1900. Post gives several species new to science, including *Phlomis Cypria* and *P. Bertrami*, but he appears to have overlooked Sintenis's papers in *Öst. Bot. Zeitschr.*, for several of his plants were previously recorded by Sintenis; and no less than twenty were recorded by Boissier himself in the *Flora Orientalis*.

Cyprus is forty-five miles distant from the nearest point of Asia Minor, and sixty miles from Latakia on the Syrian coast. The island is one hundred miles long and from thirty to sixty miles broad, and a narrow peninsula, five or six miles broad, runs out for forty miles towards the north-east.

The geological formations range from cretaceous to pliocene and pleistocene; and the igneous rocks, comprising serpentine, variolite, gabbro, &c., form a broad belt of mountainous ground in the south central part of the island.

There are two mountain ranges running more or less parallel to each other from east to west. The northernmost range extends almost the whole length of the island from Cape Kormakites on the north-west to Cape Andreas at the head of the horn-like promontory mentioned before. The higher and western part of the northern range is called Kyrenia; it is calcareous, and rises to

3340 ft. It is very picturesque and rugged in outline, but it can be crossed in many places, and there are three well-defined passes over it.

The southern range of mountains is much more extensive, and culminates in Mount Troodos, the highest point in Cyprus, 6406 ft. above sea-level. The two other chief peaks are Adelphe, 5305 ft., and Maschera, 4674 ft. Numerous spurs run north and south of Troodos, and to the west the range is twenty miles wide. Here are extensive forests, rarely visited except by wandering flocks and by wood-cutters, according to Sir R. Biddulph, C.B., late High Commissioner in Cyprus, to whom I am indebted for several facts about the mountains. These forests afford shelter to the moufflon, or wild sheep of Europe.

Numerous rivers descend from both sides of the southern range, but they are mostly dry in summer.

Between these two mountain ranges lies the great plain called Messaria, the most fertile part of Cyprus, producing large crops of wheat, barley, and cotton. In the lowlands near the coast are several inexhaustible salt-lakes.

The climate varies in different localities; in the plains the summer heat is very great, frequently 100° F. in the shade. The rainfall varies from fifteen to twenty-three inches, but on one occasion six inches of rain fell in three hours; and, though in winter it sometimes rains for many days in succession, the summer is rainless, and with an uninterruptedly cloudless sky. Unger and Kotschy tell us that during the whole time (March to October) they were in Cyprus scarcely any rain fell. In winter it is relatively cold, and artificial heat has often to be used, but the mean winter temperature is not low enough to arrest vegetation—indeed, there is what may be termed a winter flora. The early flowering in Cyprus is particularly well illustrated in the Lascelles collection, so many of which plants bloomed in January, February, and March.

Vegetation suffers chiefly from drought and locusts, both of which formerly did enormous damage; but, thanks to the measures adopted by the British Administration, these two difficulties have greatly lessened of late.

Mr. A. E. Wild, Deputy Conservator of Forests in India, made a Report (published as a Parliamentary paper) on the forests of the south and west of the island, which are chiefly composed of *Pinus maritima* and *P. Laricio* on the upper slopes, and dwarf oak and arbutus on the lower slopes. The cultivation of mulberry and of the carob and olive should be encouraged among the inhabitants of the lower hills and plains.

Earlier works on Cyprus state that in former times it was a densely wooded country. Three hundred years ago the Turks succeeded to the island, and it is to their total neglect of the forests that we must attribute their present poor condition and decreased area.

Pinus maritima prevails up to 4000 ft., above which altitude it is replaced by *P. Laricio* and its variety *Poiretiana*. It is only in the shade of *P. maritima* that *Europhaca bætica* flourishes, and

Quercus alnifolia, *Arbutus Andrachne*, and *Acer creticum* are often associated with it as underwood. Few flowering plants flourish under the pines. Perhaps the most conspicuous is the handsome *Pæonia corallina*. *Juniperus fœtidissima* and *Berberis cretica* grow among the pines on or near the summit of Troodos. *Cupressus horizontalis* and *Juniperus phœnicea* are rapidly disappearing as forest trees, though the latter spreads as a shrub when the maritime pine makes room for it. *Quercus inermis* and *Q. Cypria*, the only arborescent kinds of oak, are now quite rare as trees; while *Platanus orientalis* and *Alnus orientalis* grow only by the side of streams.

Sir Samuel Baker in 1879 communicated to Sir J. D. Hooker the discovery in Cyprus of a new variety of the cedar of Lebanon, which was afterwards called *Cedrus Libani* var. *brevifolia*. It differs from the other known forms of cedar in the shortness of the leaves and the smallness of the female cones. A note on this new cedar by Sir Joseph Hooker appeared in the *Journal of the Linnean Society*, xvii. 517 (1879). Sir Samuel Baker also reported the discovery of two species of cypress in 1879, one having a cedar-coloured timber, with a powerful aromatic scent, and the other was an intensely hard wood resembling *lignum vitæ*. Neither tree attains a greater height than 30 ft.

It appears that still more careful attention should be paid to the forests and forest trees of Cyprus, though stringent measures have been taken to prevent the evils of former days from the ravages of goats and the extraction of pitch. Until recently it was the custom to burn the brushwood and herbage in order to get fresh land, as manuring and thorough tillage were hardly known; and these fires often extended to the forests, doing enormous damage.

The general character of the flora is Mediterranean, as distinguished from Syrian; or, according to Mr. Geo. E. Post, it is a mixture of the plants of Syria, Cilicia, and Pamphylia. But the long period the island has been separated from the mainland has caused the development of a fairly large number of endemic species, which are found almost entirely in the mountains. The flora of the central plain is much the same as that of the maritime plain of Syria. The prevalence of needle-leaved trees in Cyprus is noteworthy, whereas in Syria these are largely replaced by flat-leaved trees.

Unger and Kotschy recorded forty-two endemic plants in Cyprus, including varieties. Several of these have since been found elsewhere in the Orient, but other new species, particularly those discovered by Mr. Post, take their place; so that now, even if we exclude several names which are not worthy of specific rank, there are at least fifty-five good species believed to be peculiar to the island. An asterisk precedes the endemic species in the list of additions. This compares with the fifty species endemic in the Balearic Isles in the West of the Mediterranean; and with one hundred and thirty-eight species endemic in Sicily, according to Lojacono Pojero. Naturally there are a number of other plants in

Cyprus which have hitherto only been seen in Crete and certain islands of the Grecian Archipelago.

Another striking feature of the flora is the large number of rare bulbous Monocotyledons which adorn the hills in early spring.

The *Grasses* have not been well collected, though about eighty species have been recorded.

Juncaceæ and *Cyperaceæ* have also been little collected on the island.

Juncus pygmaeus Thuill. is recorded by Boissier, *Flora Orientalis*, vol. v., "Ex Insula Cypro prope Larnaka, Mayo 29, 1877, J. Ball, No. 2436." The specimens of that number in the Kew Herbarium, to which the late Mr. Ball added, "The only Oriental specimens seen by Boissier," are certainly *J. bufonius* L., as I have recently pointed out in this Journal.

Only fourteen ferns and four fern allies have yet been recorded from Cyprus. All are natives of Britain except *Gymnogramme leptophylla*, *Nothochlæna lanuginosa*, and *N. Marantæ*, *Cheilanthes fragrans*, and *Pteris longifolia*.

Agriculture in Cyprus is undoubtedly in a very bad state. Barley is cultivated more than wheat or oats, for it ripens earlier than wheat, and thus more readily escapes the locusts. And yet the fertility of the soil of the great central plain is such that in a good year forty bushels of barley or twenty-five bushels of wheat per acre are yielded without fertilizing agents other than the deposits left by the winter torrents. Several leguminous plants are cultivated, such as *Ervum Ervilia*, *E. lens*, *Lathyrus Ochrus*, *Vicia Faba*, and *Cicer aristinum*. Cotton, madder, tobacco, flax, and hemp are grown on a small scale. Cyprian madder is surpassed only by Smyrnian. The sugar-cane was formerly extensively grown, but it was not found in the island by Unger and Kotschy. The potato is restricted to the mountain regions. Gourds, melons, and cucumbers are common, but the cultivation of vegetables in the ordinary sense is very little practised, though cabbage, artichokes, asparagus, and cress (*Lepidium sativum*) grow wild in the island.

Grape culture is the most important branch of husbandry, and excellent wine is made in sufficient quantity to enable much to be exported. Olive trees are cultivated all over the island, up to an elevation of 3500 ft. The carob tree (*Ceratonia siliqua*) is widely spread, and reaches 2000 ft. in the hills. The carobs are mostly shipped to Trieste, where a spirit is made from them. The chief fruit-trees cultivated are: Fig, orange, citron, mulberry, pomegranate, almond, walnut, cherry, apple, pear, and medlar. They are mostly grown in orchards.

The following are the works most frequently quoted in the accompanying list, with the abbreviations by which they are indicated. The exact reference for each plant is omitted for want of space:—

SIBTHORP, J., and SMITH, J. E., 'Flora Græca,' 1806–1840
= *Sibth.*

SIBTHORP, J., and SMITH, J. E., 'Floræ Græcæ Prodrômus,' 1806-1813 = *Smith*.

POESCH, JOSEPH, 'Enumeratio Plantarum hucusque cognitarum Insulæ Cypri,' Wien, 1842 = *Poesch*.

UNGER, F. and KOTSCHY, TH., 'Die Insel Cypern,' Wien, 1865 = *Kotschy*.

BOISSIER, EDMOND, 'Flora Orientalis,' vols. 1-5, 1867-84; and Supplementum, 1888 = *Boiss*.

SINTENIS, PAUL, "Cypern und seine Flora," in 'Oestr. Bot. Zeitsch.' xxxi. and xxxii. (1881 and 1882) = *Sintenis*.

POST, REV. GEO. E., "Plantæ Postianæ," in 'Bulletin de l'Herbier Boissier,' 1897, and in 'Mémoires de l'Herbier Boissier,' fasc. x. 1900 = *Post*.

The sequence of the following list is that of Boissier's *Flora Orientalis*. * prefixed to the name indicates that the plant is probably endemic. ! indicates that I have seen a specimen from the locality cited.

RANUNCULACEÆ.

Anemone stellata Lam. Hills above Furni, *Kotschy* !

A. blanda Schott & Kotschy. Castle Regina, *Kotschy* !

Adonis autumnalis L. Between Coffino, Nicosia, and Limasol, *Post*.

A. æstivalis L. Prodromo, *Kotschy* (794 !).

Ranunculus aquatilis L. var. *sphærospermus* Boiss. Famagusta, *Post*.

R. calthæfolius Jord. Nisso, *Post*; near Monastery of Chrysostomo, *Sintenis* (908 !).

R. Ficaria L. Near Prodromo, *Kotschy* !

R. bullatus L. Near Papho, Larnaka, and Famagusta, *Kotschy*.

R. millefoliatus Vahl. Under the Castle Regina, Pentadactylon, *Kotschy* !; plains of Cyprus, *Post*.

R. myriophyllus Russ. Rocks near the Monastery of Chrysostomo, at the foot of Buffavento, *Kotschy*.

R. cicutarius Schlecht. Golf Ground, Larnaka, *Lascelles* !

R. neapolitanus Ten. Above Lapithos, *Sintenis* (620 !).

R. parviflorus L. Prodromo, *Kotschy* !

R. trachycarpus F. & M. Cypress woods near Chrysostomo, *Kotschy* !; fields near Kythraea, *Sintenis* (86 !).

R. muricatus L. On the Aqueduct near Hagia Napia, *Kotschy* !; near Kythraea, *Sintenis* (89 !).

R. arvensis L. Troodos, *Kotschy*; fields near Kythraea, *Sintenis* (85 !).

Nigella stellaris Boiss. Anadhyron, *Lascelles* !

N. sativa L. Fields above Lapithos, *Sintenis* (619 !); Ayios Paolo, *Lascelles* !; Cypro frequenter culta, Boiss. Fl. Or. Suppl. 16.

N. damascena L. Papho, *Post*; river between Kalorgha and Lefkonicus, *Sintenis* (537 !).

Delphinium peregrinum L. Perapidi, *Post*; vineyards near Galata, *Sintenis* (850 !).

Pæonia corallina Retz. var. *triternata* Boiss. Mount Papulza, *Post*.

BERBERIDEÆ.

Berberis cretica L. Summit of Troodos, *Sibth.*; about Prodromo, extending to the top of Troodos, *Kotschy*.

Bongardia Rauwolfii C. A. Meyer. Sta. Croce and Lefkera, *Kotschy*!

PAPAVERACEÆ.

Papaver dubium L. About Prodromo, Dimithu, and Trisedies, *Kotschy*.

P. Rhæas L. About Larnaka and Lapethus, *Kotschy*.

Glaucium phæniceum DC. Vineyards, *Sibth.*; Samson (not localized)!

G. corniculatum L. var. *flaviflorum* DC. Cornfields near Tannery, Lascelles!

Ræmeria hybrida DC. Near Chrysostomo, Lapethus, and Amathus, *Kotschy*; Cyprus, Samson!

FUMARIACEÆ.

Fumaria judaica Boiss. Kyrenia, Lascelles!

F. micrantha Lag. Vineyards near Prodromo, *Sintenis* (787!).

F. officinalis L. Prodromo, *Kotschy*; Cyprus, Samson!

CRUCIFERÆ.

Matthiola coronopifolia DC. Between Antiphonitus and Belpaese, *Sibth.*; near Larnaka, on conglomerate, *Kotschy*!

Arabis albida Stev. Pentedactylon, Lascelles!—var. *Billardieri* DC.; rocks at Buffavento and Pentedactylon, *Kotschy*; St. Hilarion, Post; rocks near Castle del Regina, *Sintensis* (259!).

Turritis glabra L. Trooditissa Monastery, *Sibth.*, Journ. in Walpole's Mem. p. 22.

Nasturtium officinale R. Br. Near Prodromo, *Kotschy*.

**Cheiranthus flexuosus* *Sibth.* Neighbourhood of Trooditissa Monastery, *Sibth.*

Erysimum repandum L. Near Prodromo, *Kotschy*.

Alliaria officinalis Andz. Near Prodromo, *Kotschy*.

Alyssum alpestre L.— β *obtusifolium*, Fenzl. Summit of Troodos, *Kotschy*.

Clypeola Jonthlaspi DC. About Prodromo, *Kotschy*.

Camelina sativa L. Aeckern, *Sibth.*

Notoceras cardaminæfolium DC. Cyprus, *Sibth.*; plentiful at Messaria, near Strullos, *Kotschy*.

Biscutella Columnæ Ten. Near Larnaka, and near Omodos, above Limasol, *Kotschy*; Larnaka, Nicosia, Post; Mt. Croix, *Sintensis*!

Thlaspi perfoliatum L. North side of Pentadactylon, Monastery of Chrysostomo, *Kotschy*.

T. violascens Schott & Ky. Summit of Troodos, on north side, 6000 ft., *Kotschy*.

Lepidium sativum L. Cyprus, *Sibth.*

L. latifolium L. Wet places in the low country, Gaudry, *Recherches en Orient*, p. 190 (1855).

L. Draba L. Fields near Kythraea, *Sintenis* (273!); roadsides, common, Lascelles!

L. Chalepense L. Nicosia, *Post.*

Erucaria Aleppica Gaertn. Near Lanarka, *Kotschy*; Nicosia, *Post*; Fields near Lefkonicus, No. 262, *Sintenis*!

Neslia paniculata L. Cornfields about Lanarka, *Kotschy* (80!), *Sintenis* (848!).

**Brassica Hilarionis* *Post.* Rocks at the Castle of St. Hilarion, *Post.*

B. oleracea L. Cyprus, *Gaudry*, 'Recherches,' p. 185.

B. Tournefortii *Gouan.* Near Redgelia, *Sintenis* (849!).

Hirschfeldia adpressa *Moench.* (= *Sinapis incana* L.). Dry hills near Kythraea, *Sintenis* (276!); vineyards near Omodos, *Sintenis* (918!).

Raphanus sativus L. Often cultivated in Cyprus; near Larnaka, *Sintenis*!

R. Raphanistrum L. About Larnaka and Nicosia, *Kotschy*; near Larnaka, *Sintenis*!

RESEDACEÆ.

Reseda alba L. Near Larnaka, *Kotschy*; Larnaka, *Lascelles*!

R. Phyteuma L. Near the river at Strovilo, *Lascelles*!

R. truncata *Fisch. et Mey.* Camp at Troodos, *Lascelles*!

R. lutea L. Near Larnaka, *Kotschy* (86!).

R. Luteola L. Anadhyron, *Lascelles*!

CISTINEÆ.

Helianthemum Ægyptiacum L. Santa Croce, near St. Barbara, *Kotschy* (207!).

H. pulverulentum *DC.* Sandy places between Morphu and Panteleimon, *Kotschy* (924!).

H. vulgare *Gaertn.* var. *microphyllum* *Willk.*; near Larnaka, *Kotschy*!

H. lavandulæfolium *Lam.* Near Sykhari, *Lascelles*!

Fumana Spachii *Gren. et Godr.* Near Melandrina, *Kotschy.*

F. glutinosa L. Rocks, Cyprus, *Post.*

VIOLACEÆ.

Viola Heldreichiana *Boiss.* Troodos, *Post.*

CARYOPHYLLACEÆ

Velezia rigida L. Cyprus, *Sibth.*; Prodromos, *Kotschy* (891!); mountains about Kythraea, *Sintenis* (238!).

Dianthus cinnamomeus *Sibth.* Cyprus, *Sibth.*

**D. multipunctatus* *Sér.* var. *Troodi* *Post.* Among rocks on Troodos, *Post.*

D. sulcatus *Boiss.* Troodos, *Lascelles*!

Saponaria Vaccaria L. Fields near Kythraea, *Sintenis* (270!).

Silene conica L. Cyprus, *Sibth.*

S. conoidea L. Cyprus, *Sibth.*

S. vespertina *Retz.* Near Larnaka, *Kotschy* (64!).

S. gallica L. Cyprus, *Samson*!

S. palæstina *Boiss.* var. *damascena* *Boiss. et Gaill.* (sp.). Houston's Kyrenia, *Lascelles*!

- S. Oliveriana* Otth. Near Larnaka, *Kotschy* (91!, 95 and 132).
S. Otites L. Cyprus, *Sibth.*
S. italica L. Papho, *Post.*
S. paradoxa L. Cyprus, *Sibth.*
S. pseudo-atocion Desf. Cyprus, *Lascelles*!; vineyards near Galata, *Sintenis* (768!) (*S. Galatæa* Boiss.).
Sagina maritima Don. About Larnaka, *Kotschy* (318!).
Alsine tenuifolia Wahlenb. Prodromo, *Kotschy* (898).
Stellaria media L. Castle Regina, *Kotschy*; Troodos, *Post.*—
Var. major Koch. Cyprus, *Lascelles*!
Holosteum umbellatum L. Heights of Troodos, *Kotschy* (715).
Cerastium brachypetalum Desp. Near Prodromo, 4000 ft., *Kotschy* (838).
C. anomalum W. & Kit. Troodos, *Post.*
Spergularia rubra Wahl. Plains in Cyprus, *Post.*
S. diandra Boiss. Cyprus, *Samson*!
S. marina Bess. Near Chrysostomo, *Kotschy* (388!).

PARONYCHIEÆ.

- Paronychia capitata* Lam. Near Panteleimon, *Kotschy* (941!).
Herniaria hirsuta L. Troodos, *Post.*

TAMARISCINEÆ.

- Tamarix mannifera* Ehrenb. Cyprus, *Lascelles*!

FRANKENIACEÆ.

- Frankenia hirsuta* L. Tamarisk wood near Larnaka, *Kotschy* (244!); Larnaka, *Post.*
F. pulverulenta L. Near Larnaka, *Kotschy*!

HYPERICACEÆ.

- Hypericum confertum* Choisy. Summit of Troodos, *Post.*—The var. *stenobotrys* from Troodos (*Sint. et Rigo*) is given in Boiss. Fl. Or. Suppl.
H. hyssopifolium Vill. Mountains of Cyprus, *Post.*
H. crispum L. Plains of Cyprus, *Post.*
H. perforatum L. Troodos, *Post.*

MALVACEÆ.

- Malva parviflora* L. Recorded from Larnaka by Unger and *Kotschy* as *M. flexuosa* Horn. Near Nicosia, *Sintenis* (201!).
M. cretica Cav. Near Limasol, *Kotschy*!
M. sylvestris L. Near Fini under Troodos and near Papho, *Kotschy.*
Malvella Sherardiana L. Near Larnaka, *Kotschy.*

(To be continued.)

SHORT NOTES.

HAMPSHIRE PLANTS.—The occurrence of *Vicia Orobus* in an unrecorded locality in Hampshire may be worth noticing. The plant has, according to Mr. Townsend, only been found before in Hants “between Lyndhurst Station” (by which it is presumed that Lyndhurst Road Station is meant) “and Brockenhurst, 1875, 1876, 1879,” by Messrs. Groves. I found it in June this year, growing in the midst of *Genista tinctoria*, in a rather wet meadow, on the south-west side of Brockenhurst. I observed it in one place only, but I was not able to search the field. Of course I looked for *Limosella* in the recorded locality near Brockenhurst Bridge, but I failed to find it; I afterwards found it growing plentifully on the margins of a pond near the road from Brockenhurst to Lymington, about a mile from the former place. I could find no trace of *Ludwigia*, either near Brockenhurst Bridge or elsewhere, but it was, no doubt, somewhat too early in the summer for the plant to be appearing. Neither could I find any plants of *Gladiolus*, but this is not much to be wondered at, as I was told of a lady who had collected two hundred plants for her garden! One might have hoped that such wilful waste would be limited to the tramps who ravage our country to obtain plants for sale. The *Ranunculus* with tripartite floating leaves, which Mr. Townsend places under *R. lutarius* Bouvet, seems very abundant everywhere round Brockenhurst. It is a very distinct-looking plant to me, and not like any of the batrachian ranunculi which we get in the Isle of Wight. I believe that wherever it grows in water, capillary submerged leaves are present.—FREDERIC STRATTON.

ERIOPHORUM ANGUSTIFOLIUM Roth. var. TRIQUETRUM Fries in CORNWALL.—A well-marked variety of our commonest species of cotton-grass has been so named by Mr. Arthur Bennett. It was first found late in the summer of 1905 on Trebiskin Moor, Cubert (v.-c. 1), by my friend Dr. Vigurs, and subsequently I discovered it on Trevince Moor, in the parish of Gwennap (v.-c. 1). Specimens from both localities were sent to Mr. Bennett, but they were in a very advanced stage of decay, and nothing satisfactory could be done. This season I have placed better material with Mr. Bennett, and he has been able to make a pronouncement. His letter is too interesting to remain unpublished:—“I think your *Eriophorum* is *E. angustifolium* Roth. β . *triquetrum* Fries, in *Flora Scanica*, p. 184 (1835). Hartmann, in *Sk. Fl.* ed. 11, 449, says, ‘likerande *E. gracile*,’ and that is what it is. The β . *elegans* of Bab. Man. ed. 1, 333 (1843), and of Eng. Bot. t. 2402, is now accepted as = var. *minus* Koch, Syn. Fl. Germ. et Helv. 747 (1837), but your plant is not like that plate, though the shortly peduncled spikes do approach it. The leaves in *minus* seem as in the type, only smaller and less broad. *E. triquetrum* Hoppe, Saxh. 106 (1800) is, of course, *E. gracile* Koch in Roth’s *Catalecta*, 2, 259 (1799), usually quoted as 1800, but I have seen the original and it is 1799. There is another plant, *E. Vaillantii* Poit. et Turp. Fl. Paris, t. 52 (1808) = *E. angustifolium* Roth var. *congestum* Coss et

Germ. Fl. Paris, 613 (1845) = *E. polystachion* L. β . *congestum* M. et R. Deut. Fl. 456, 1823. Cosson and Germain say, 'Epillets sessiles ou presque sessiles, rapprochés,' which does agree with your plant. Of course it may be that Fries's and Poiteau's plants are the same, but this could only be made sure of by comparison of typical specimens of each, a difficult matter. I believe, however, you may safely name your plant as I suggest." Whether growing alone, or in company with *E. angustifolium*, the var. *triquetrum* may be easily detected. It is a slender and rather diminutive plant, the spikes, even when fully matured, are less than one-third the size of the type, and are either sessile or but very shortly stalked. Perhaps a more important character is that *triquetrum* is quite a fortnight later than *E. angustifolium* in flowering. — FRED. HAMILTON DAVEY.

[*Eriophorum gracile* is frequently cited as of Koch, but there seems no justification for this. Roth (*Catalecta* ii. addendum [p. 259]) says that the plant was first observed by Koch, "qui mecum specimina cum observationibus suis benevole communicavit"; but he does not say that Koch suggested the name, nor does he attribute it to him in subsequent citations. Koch himself (Koch & Ziz. *Cat. Pl. Palat.* [3], (1814) cites it as of Roth, though later (*Synopsis*, ed. 2, 861 (1844)) he cites "Koch ap. Roth." The *Index Kewensis*, gives the date of the *Catalecta* as 1799, but, although the preface is dated February of that year, we have been unable to find any evidence that the book was published before 1800—the date on the title-page; and Mr. Bennett does not remember where he found reason to prefer 1799. The name *E. triquetrum* Hoppe (*Taschenbuch*, 1800, 106) is sometimes preferred to *E. gracile*, but there seems no reason to suppose it can claim priority. Roth does not cite the *Taschenbuch* for 1800 in his paper on *Eriophorum* (*Neue Beyträge*, i. 92 (1802)), and does not include in it *E. latifolium* Hoppe, which was published in the *Taschenbuch* for 1800. He cites *E. Scheuchzeri* Hoppe from the *Taschenbuch* for 1799 (p. 109)—a reference earlier than that given in the *Index Kewensis*—but makes no allusion to its description in the 1800 volume; and these facts suggest that the 1800 *Taschenbuch* was not published at the time Roth wrote his paper.—ED. JOURN. BOT.]

CAREX MONTANA L. IN CORNWALL.—For several years I have unsuccessfully searched the most promising parts of Cornwall for this species. Mr. Arthur Bennett now sends me the welcome tidings that he has two specimens, which by sheer accident he found mixed with a gathering of *Luzula pilosa*, forwarded from Cornwall by the late Mr. William Curnow, and labelled "Hustyn Wood, near Bodmin, East Cornwall, May, 1878." Mr. Curnow was evidently unaware of the presence of this little rarity, and it had quite escaped Mr. Bennett's notice until recently, when he had occasion to look up all his *Luzula* material to deal with a query from one of his correspondents. Mr. Bennett refers the specimens to *C. montana* L. forma *flavida* Waisbecker in Oesterr. Bot. Zeitschr. xlv. 109 (1895). The only British specimens he has seen which in any way approach those from Cornwall are from Roborough Downs, South Devon. Hustyn Wood, where Mr. Curnow gathered his specimens,

is an extensive range of oak coppice in the parish of St. Breock, about two miles south of Wadebridge (v.-c. 2). I made a careful search of the most likely parts of the wood on June 23rd, but the only Carices I saw were *C. pilulifera*, *C. muricata*, *C. verna*, *C. lavigata*. Mr. Bennett informs me *C. montana* is an early-flowering plant, and he thinks I was quite a month too late to find it.—FRED. HAMILTON DAVEY.

[Waisbecker's description of his forma *flavida* consists of two words only—"Bälge blassgelb."—and Mr. Bennett writes to us that, although the plant has a different look, the fruit on dissection shows no difference between Sussex and Cornish specimens.—ED. JOURN. BOT.]

PARIETARIA RECLINATA Moon, Cat. Pl. Ceyl. 72.—This, as stated by Sir Joseph Hooker in the *Flora of Ceylon*, "is not taken up in any more recent work." It is cited from Moon in the *Index Kewensis* without any indication that Moon's catalogue is merely a list of names, most of which are rightly excluded from the *Index*. Mr. Moore has shown me a specimen from Ceylon, collected in 1819 and so named, not indeed in Moon's hand but probably from him. It occurred to us to look at the interesting little volume of Moon's descriptions, with drawings by a native artist, preserved in the Department of Botany, and there we found a full description of the plant with an excellent figure, which was rightly named by Trimen *Pouzolzia Walkeriana* Wight. Trimen went through the drawings—forty-one in all—and named them; it may be worth while to give a list of the few which Moon considered new species and of which the names are published in his *Catalogue*. None of them save the last is in the *Index Kewensis*—there is no reason why they should be—nor have I made any attempt to identify the numerous other names which appear in the *Catalogue*. Those figured and described in MS. are—

Loranthus incanus (Cat. p. 26) = *L. tomentosus* Heyne, var.

L. spatulata (l. c.) = *L. cuneatus* Heyne.

Cameraria oppositifolia (Cat. p. 20) = *Hunteria corymbosa* Roxb.

Alsine nervosum (Cat. p. 23) = *Drymaria cordata* Willd.

Ficus politoria (Cat. 74, not of Loureiro) = *F. asperrima* Roxb.

Mr. Boulger (*Fl. Ceylon*, v. 374) says "some of Moon's drawings are in the Botanical Department of the British Museum"; the drawings, however, are, I think, clearly by a native artist, and the descriptions (which Mr. Boulger does not mention) are not in Moon's hand, but are doubtless a transcript from his MSS., as he signs his name at the end of the collection.—JAMES BRITTEN.

ELEOCHARIS UNIGLUMIS IN DEVONSHIRE.—In June I found, in a bog near Combemartin, *Eleocharis uniglumis* Link. This is, I believe, a new record for Devon.—C. E. LARTER.

CERASTIUM ARVENSE IN DORSET.—In the second edition of the *Flora of Dorset* this plant is recorded from two stations, and the Rev. E. F. Linton (*Journ. Bot.* 1904, p. 237) mentions another. Two of these are on the extreme east of the county, between West Moors and Alderholt, while the third is near the centre at Deverill

by Milborne St. Andrew. The localities given in the *Flora* are described as the sides of a railway in one case, and as cultivated ground in the other. Neither of these can be regarded as satisfactory for a species which in other counties grows in the turf of limestone hills and chalk downs. When rambling at Whitsuntide from Black Down along the Ridgeway range I came upon a large, rough, stony pasture open to the south, and in this *Cerastium arvense* grew in considerable quantity over all parts. This spot is twelve miles south-west of Deverill in an air line, but the discovery does not extend the western range of the plant in Britain, as that appears to have been found in South Devon (Record Club, 1881-2).
—IDA M. ROPER.

NOTICES OF BOOKS.

The Rusts of Australia: their Structure, Nature, and Classification.
By D. McALPINE. 8vo, cloth, 349 pp. 55 plates (366 figures).
Melbourne: R. S. Brain. 1906.

THERE is no doubt that a great impetus has been given to the study of Rusts by Klebahn's notable book on the heterœcious *Uredineæ*. It has enabled students to see what had already been done by the various workers on this important group, and has provided a good starting-point for further observation and research. Mr. McAlpine's book on Australian rusts takes up the subject for that far-away land, and it is remarkably interesting to read the records of the rusts for a country where the plants that play the part of hosts vary so much from those in Europe. One striking fact commented on is that so few indigenous Australian rusts are heterœcious, only four species, so far, have been proved to change their host during their life-cycle; three of these grow on *Gramineæ*, with their æcidial stage on various *Ranunculaceæ*; the fourth, *Puccinia caricis*, produces its æcidium on *Urticaceæ*. All the others are autoœcious, and complete their life-history on one host-plant. Another remark of interest is that, on some of the most predominant families, such as *Myrtaceæ* and *Proteaceæ*, rusts are practically absent; in the latter order only one uredo is recorded. There is no authenticated rust on any *Eucalyptus*. A number of species have been introduced into the country with their special hosts, and a separate list of these is given.

In the first part of the book the whole history and theory of rusts is dealt with. The fungus is described and explained in all its stages, in such a way as to make the subject intelligible and interesting to the non-scientific reader. The second part gives diagnoses of all the species, native or imported, with their habitat, locality, &c. The existence of biological species is explained, but the descriptions are entirely based on morphological characters.

The author attacks the puzzle of the spermogonium with great courage, and hazards the theory, that, as it is always the first organ to be reproduced after sowing the germinating teleutospores, it thus takes origin directly from the sporidiolum, and may be a conidial form of sporidiolum reproduction. The inclusion of spori-

diola in closed spermogonia, and their ejection as the so-called spermatia in a sweet sticky mass, ensured them a wider dispersion by insects. But as time went on, and uredospores came to the front, these spermatia were less necessary to the continuance of the fungus, and gradually became functionless. This seems a far-fetched explanation, especially when we have the analogy of spermogonia in the lichens to guide us to their probable origin as male organs. We can hardly regard the functionless spermatia as secondary forms of sporidiola, when these latter have always played such an essential part in the life-cycle; if the function were the same, the vitality would hardly disappear so quickly and so entirely.

Much of the interest attaching to rusts is due to their immense economic importance as the universal parasite of cereals. Australian wheat-fields have not escaped the scourge, and the spread of the disease has been helped by the method of securing the grain. The heads only are taken off by the combined harvester, which "delivers the winnowed grain into bags." A certain amount of seed falls to the ground; it germinates at once, and the young plant is almost always rusty. A knowledge of rusts, as well as of other plant diseases, is essential to the cultivator if he is to secure healthy crops, and this book supplies him with just the data necessary to recognize the various forms, and to apply what remedy there is. Immune varieties are specially recommended. The spores of all the species are illustrated by microphotographs, and various galls, witches' brooms, and other abnormalities due to the rust-fungus, are also illustrated by photography. A genus, *Uromycladium*, peculiar to Australia, produces large galls on various species of *Acacia*; one is recorded and figured that weighed three pounds. Copious indexes and a bibliography add to the value of the work.

Mr. McAlpine is the Government vegetable pathologist, and the book has been issued under the auspices of the Department of Agriculture, Victoria. He has earned the thanks of all plant-growers in Australia by this useful and interesting account of rust-fungi. It remains with the grower himself to take advantage of the knowledge offered, and to carry into practice the author's suggestions and recommendations.

A. L. S.

BILANCIONI, GUGLIELMO. *Dizionario di botanica generale: istologia, anatomia, morfologia, biologia vegetale. Biografie di illustri botanici.* Milano: Hoepli, 1906. Pp. xxii, 926, 8vo (6 in.). 10 lire.

THE rapid increase of botanic terms due to modern research and methods has caused the issue of several volumes within the last few years, intended to supply prompt answers to questions which confront the student in his work. The alphabetical arrangement of articles on special points is useful, as the book then becomes its own index. Thus we have in English a recent *Glossary of Botanic Terms*, noticed in this Journal (1900, 456; 1905, 367), and not long since a larger German work by Dr. Schneider, which was reviewed in these columns last December (p. 366).

The volume now before us, still more than Schneider's work, partakes of the character of an encyclopædia, and is nearly double that in extent of matter. To take a few instances—"Nutrizione" extends to more than thirty-five pages (seventy-one columns); "Cellula," nineteen pages; "Accrescimento" to twelve pages; and "Tessuto" to eleven pages. This amplitude of treatment permits of a goodly display of authorities being appended, and for those who read Italian with ease the book will be of considerable use. It is a matter of course that Italian headings prevail, with the effect that Ph is practically non-existent, there being only four headings with seven lines under that transliteration of the Greek character, the rest being transferred to F; H has only three columns, the majority being placed under the vowel which follows the aspirate.

An appendix of names of botanists occupies more than a hundred pages, and it is a matter of regret that the author did not get some English reader to supervise the names. Passing by many minor misspellings, we find too many actual mistakes—such as Bentham, "Stoke upon Trent, Strafford"; Darwin, "Contea di Shrop"; Sir Joseph Hooker is described as "valente Prof. di bot. a Kew"; his father is said to have been born at "Exeter," and Lindley at "Chatton," this being Pritzel's mistake for Catton; Gerard's death is given as "1607," and Clemente appears twice, once under C, and again under Rojas de Clemente. This appendix seems the least satisfactory part of the work, which otherwise offers a useful and compact handbook for inquirers.

B. D. J.

BOOK-NOTES, NEWS, &c.

WE have only lately seen the two first instalments of the *Index Plantarum Japonicarum* by Professor Matsumura, which bears date 1904 and 1905 respectively. The first is devoted to Cryptogams, the second, which is the first part of the second volume, to Gymnosperms and Monocotyledons. We regret that we are unable to read the preface, which is in the Japanese language though in Roman characters, but the scope of the work is indicated on the title-page as including the plants of the various islands "systematice et alphabetice disposita, adjectis synonymis selectis, nominibus japonicis, locis natalibus." It is most admirably printed (at Tokio) and got up; the selection of types and the arrangement of such details as page-headings are excellent. There is a full bibliography, with indications of the abbreviations employed for the works chiefly consulted; some of these abbreviations are perhaps open to criticism—*e.g.*, "Vnt." for Vaniot; "Clk." for Clarke; "Dyer, J. L. S." for "Thiselton-Dyer, W. T. The Journal of the Linnean Society;" "Hemsl. J. B." for "Hemsley, W. B.—The Journal of Botany, British and Foreign"—the two last meaning of course that the authors named have written pages in the respective journals. Nor is there any gain, either in space or convenience, in abbreviating Rolfe, Rendle, and Boott to "Rolf.," "Rendl.," and

“Boot.” Perhaps the next Botanical Congress will take into consideration the desirability of establishing a uniform method of literary citation.

SIR RICHARD STRACHEY and Mr. J. F. Duthie have published (L. Reeve & Co.) a *Catalogue of the Plants of Kumaon*, based on the collections made by the former (with Mr. J. E. Winterbottom) in 1846–49 and on a catalogue originally prepared by him in 1852. This latter has been revised and supplemented by Mr. Duthie, who, in a brief introduction, describes the scope of the work. The catalogue contains 3043 species, representing 1084 genera; it is arranged in tabular form, showing habit, colour of flower, time of flowering, elevation above sea-level, and distribution.

VOLUME IV. “Sect. 2,” of the *Flora of Tropical Africa* is completed by the publication of its third part, which concludes the *Scrophulariaceæ* by Messrs. Hemsley & Skan, and includes the orders *Orobanchaceæ*, *Pedaliaceæ*, and *Lentibulariaceæ*, by Dr. Stapf—the last, it seems to us, particularly well done—*Gesneraceæ* (Messrs. Baker & Clarke), and *Bignoniaceæ* (Mr. Sprague). There is also an appendix, arranged so as to give as much trouble as possible by not printing in full the name of the genus or the number of the page to which additions are made, or even the name of the order—one opens at “6a. *S. togoense*,” without knowing what “*S.*” stands for, where “6a” is to be inserted, or to what order it belongs. The late Director of Kew remains editor of the work, and it is to be regretted that he should not have recognized the inconvenience of this proceeding.

THE most recent part (vol. iv. no. 3, issued June 7) of the *Records of the Botanical Survey of India* completes the epitome of the British Indian species of *Impatiens* by Sir Joseph Hooker. *Impatiens* is “the second largest genus of Indian plants,” containing about two hundred species, a number exceeded only by *Dendrobium*. The classification adopted is geographical, “the restriction of the vast majority of the species each to its own region of distribution (Eastern Himalayan, Western Himalayan, Burmese, Malabarian, Ceylonese and Malayan Peninsular), and the great difference between the species of any two of these regions, necessitates the adoption to a great extent of different sections in each area.” There are numerous novelties, the characters of which are indicated in the keys to the species of the different regions. The genus, as is well known, presents many difficulties, and we congratulate Sir Joseph on the continued activity which has enabled him to complete his task.

A COMMITTEE of the Moss Exchange Club is preparing a Census Catalogue recording the distribution of mosses in the British Isles, and would be glad to hear from any bryologists who can render assistance. Communications to be addressed to Prof. Barker, Woodlea, Lightwood, Buxton. The Committee is formed of Messrs. Dixon, Barker, W. Ingham, D. A. Jones, R. H. Meldrum, W. E. Nicholson, Rev. C. H. Waddell, J. A. Wheldon, and S. M. Macvicar. Further assistance to improve the lately published Census Hepatic Catalogue will be welcomed by W. Ingham, 52, Haxby Road, York.

HERR J. DÖRFLER (III. Barichgasse 36, Vienna) is publishing, under the title *Botaniker-Porträts*, a collection of portraits of eminent botanists, in parts each containing a decade at the price of 5s. each. The portraits are in quarto size, printed on card, with a facsimile of signature and a short biography; they are exceedingly well executed, and very cheap. Single copies cost 1 mark each, or ten selected portraits will be sent for 8 marks. The parts will be issued at irregular intervals—a hundred will form a volume, for which title-page and index will be supplied. The first fascicle contains portraits and biographies of Kerner, Wiesner, Warming, Engler, de Vries, Guignard, Schröter, Mattiolo, Wille and Wettstein; the second, E. M. Fries, T. M. Fries, Pfeffer, Borodin, Hackel, Scott, Goebel, Errera, Chodat and Ikeno (Tokio). The collection will form a valuable addition to every botanical library, and its interest will increase as time goes on.

We are glad to announce the completion of the First Supplement to the *Index Kewensis* by the publication of part iv. We shall have more to say about it later; meanwhile we note that, by a strange misprint, both the wrapper to the part and the title to the volume announce it as “ab initio anni MDCCCLXXXVI usque ad finem anni MDCCCLV complectens.”

MR. W. JUNK of Berlin announces an “excellent chemical reprint on best paper” of the first edition of Linnæus's *Species Plantarum*, at the subscription price of £1 12s. The importance of the work and the extreme rarity of the original should secure the success of this venture.

THE *Philippine Journal of Science* has issued the first of a series of botanical supplements, to contain papers on systematic botany, including diagnoses of new species, notes on synonymy, obscure or unknown species, &c., and monographs of various families and genera of Philippine plants. The supplements will be of the same style and size as the Journal, but will be paged and indexed separately. They will be supplied to subscribers to the journal without extra charge; to others who may desire copies they will be sold at the price of fifty cents per number; they may be obtained from the Director of Printing, Manila. The first supplement, dated April 15, contains a Flora of the Lamao Forest Reserve, by Mr. Elmer D. Merrill, arranged according to the sequence of Engler and Prantl's *Pflanzenfamilien*. Mr. Merrill has had the co-operation of well-known authorities in certain orders, among them Mr. C. B. Clarke, Mr. Ridley, and Dr. Prain: a large number of new species are described.

THE Stationery Office has issued (price 1s. 5d.) a Report by Mr. M. T. Dawe of his *Botanical Mission through the Forest Districts of Buddu*, with special reference to the economic resources of Uganda. It contains a list of the plants collected, in which we notice a number of new and nude names bestowed by the authorities at Kew. It is to be regretted that such names should be published without at least a brief diagnosis; plates, however, are given of three new *Landolphas* as well as of *Clitandra orientalis* and *Fun-*

tumia elastica. It is unfortunate that the proofs were not more carefully read, as misprints abound both in names and authorities; thus, three out of the five *Ranunculaceæ* are attributed respectively to "Dillet" "Debile" and "Pais," meaning Dillon, Delile, and Poiret.

Mr. J. MEDLEY WOOD continues to make steady progress with his *Natal Plants*. Part 4, concluding the fourth volume, and the third part of volume v., which is devoted to Grasses, have lately been issued. The plates, though roughly executed, cannot fail to be useful. From a general point of view, we might wish that a larger proportion of plants of botanical interest were selected for figuring; but the primary object of the work is, of course, to be useful locally, and no doubt Mr. Wood knows what is most suitable for this purpose.

THE *Transactions of the British Mycological Society* (Worcester, 1906), recently published, presents an interesting record of good and useful scientific work. There is an account of the annual fungus foray at Haslemere, drawn up by Mr. Carleton Rea, who describes the ground explored, and notifies the more interesting species collected. The number observed or gathered by the members on the different excursions amounted to four hundred and eighty-eight, two of them, *Sparassis laminosa* and *Hypoderma Desmazieri*, being new records for Britain. The President of the Society, Mr. R. H. Biffen, contributes a paper on "Combating the Fungoid Diseases of Plants," a subject he is well fitted to deal with. The valuable list of "Fungi new to Britain" is undertaken, as in previous years, by A. Lorrain Smith and Carlton Rea. The novelties belong mostly to the larger fungi, and those new to science are illustrated by coloured plates drawn by Mrs. Rea. The next fungus foray is to take place at Epping Forest towards the end of September, under the presidency of Mr. Arthur Lister. The Forest has been many times explored by the Essex Field Club; but doubtless some hitherto undiscovered species remain still to be hunted up.

M. ÉMILE BOULANGER has issued, in pamphlet form, the various papers he has been publishing within the last few years on Truffles. He has had great success in the germination of truffle-spores, and in the artificial culture of truffle-beds, though these are not yet old enough to be remunerative. He gives a series of photographic figures representing the germination of the spore, which takes place within the ascus. The echinulate ecospore disappears, and the endospore swells and produces a filament. The author has not proceeded further in his study of development, but he promises continued research on the subject.

FREDERICK HENRY ARNOLD, F.S.A., was born at Petworth, Sussex, on February 18, 1831. He was privately educated, but graduated B.A. at Trinity College, Dublin, in 1859, proceeding to M.A. and LL.B. in 1864, and to LL.D in 1892. He held various ecclesiastical appointments in Sussex, and was presented in 1865 to the living of Racton-cum-Lordington, which he held till his death at Emsworth

—there was no residence at Racton—on the 4th of last May. He was greatly interested in the history of his county, and in its various archæological and natural history societies. In 1887 he published a *Flora of Sussex*, which, although useful, cannot be said to take rank among our best local floras. We learn from a prospectus, to which further reference is made below, that a “second edition, enlarged and revised,” was prepared for the press, and will be published by subscription. Apart from this work, Arnold contributed but little to botanical literature. A short note on *Lepidium latifolium* will be found in this Journal for 1887 (p. 215); and he prepared for the recently issued “Victoria County History” of Sussex the account of the botany of the county which we were compelled to criticize unfavourably (Journ. Bot. 1906, 135). He was a correspondent of H. C. Watson, and his name—wrongly given as J. H. Arnold—appears in the list of correspondents appended to the second edition of *Topographical Botany*. As a clergyman Arnold was greatly respected, and his stores of general information were at the disposal of all who sought his help.

A PROSPECTUS issued by the daughters of the late Dr. Arnold informs us that a second edition of the *Flora of Sussex* will be issued by them to subscribers at 4s. 6d. net, “if a sufficient number is obtained to justify this course.” “The MS.,” the preparation of which was “the final work” of Arnold’s life, “is quite ready for the press, and no further treatment of it by any other hand will be solicited or permitted.” This filial respect is quite intelligible, but we fear that, without competent editing, the work will not represent our present knowledge of Sussex botany. As we lately had occasion to point out (pp. 135, 136), Arnold had not kept himself *au courant* with recent botanical literature, and the extract from his preface given in the prospectus confirms this opinion. The volume will be illustrated by Miss Marian H. Arnold. Subscribers’ names should be sent to the Hermitage, Emsworth, Sussex.

A SECOND edition of the *Hand-list of Ferns and Fern Allies* cultivated in the Royal Gardens, prepared by Mr. C. H. Wright, has also been issued (price 5d.). We are glad to see that the present Director of the Gardens, in his preface, mentions the name of the compiler; this new departure is not only convenient for purposes of reference, but also gives due credit to the person to whom the execution of the work has been intrusted.

AN interesting “Catalogue of Portraits of Botanists exhibited in the Museums of the Royal Botanic Gardens, Kew,” has been printed by the Stationery Office (price 5d.). The author, Mr. J. D. Milner, is Secretary to the National Portrait Gallery, and the work is produced in a style which, while leaving much to desire from an æsthetic standpoint, is uniform with the similar officially-printed catalogues. The foundation of the Kew Collection was that of Sir William Hooker, which was purchased for the Gardens for £1000. Brief biographies are given of each subject, and the work is a useful companion to the *Biographical Index of British Botanists*, which has, we think, been of considerable service in its compilation.

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THE JOURNAL OF BOTANY was established in 1863 by Dr. Seemann. In 1872 the editorship was assumed by Dr. Henry Trimen, who, assisted during part of the time by Mr. J. G. Baker and Mr. Spencer Moore, carried it on until the end of 1879, when he left England for Ceylon. Since then it has been in the hands of the present Editor.

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Bibliographical matters have also received and continue to receive considerable attention, and the history of many obscure publications has been elucidated. Every number contains reviews of new and important books written by competent critics: in this as in every other respect a strictly independent attitude has been maintained. While in no way officially connected with the Department of Botany of the British Museum, the Journal has from the first been controlled by those whose acquaintance with the National Herbarium has enabled them to utilize its pages for recording facts of interest and importance regarding the priceless botanical collections which the Museum contains. In 1896 it became necessary to increase the size of the Journal, owing to the number of papers sent for publication: the number of plates was at the same time augmented.

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THE GENUS TELEPHIUM.

BY FREDERIC N. WILLIAMS, F.L.S.

AFTER many vicissitudes the genus *Telephium* finds a suitable resting-place and natural position in the family of *Caryophyllaceæ*, where it remains, however, the most aberrant genus-type of the whole family, and one whose affinities have long puzzled systematists and compilers of floras. In his fragmentary attempts at a Natural Method Linnæus placed the genus in three different "orders." In his first sketch (*mss. Linneana*), he included it in the *Miscellanæ*, n. 54; in *Philosophia Botanica* (ed. 2, 1763), p. 39, he included it in n. 60, *Perforatæ* (misprinted "n. 40" in the index), with *Cistus*; and in his *Prælectiones in ordines naturales* (ed. Giseke, 1792), included it among the *Holeraceæ*, p. 306. Jussieu,* with rare insight, placed *Telephium* among the *Portulacææ*, but afterwards† transferred it to the new order of *Paronychiææ*. Endlicher‡ subsequently rightly reduced the group to a tribe of *Caryophyllaceæ*. Bentham and Hooker,§ however, somewhat obscured its affinities, by transferring the tribe of *Paronychiææ* to *Illecebraceæ*, at the same time excluding *Telephium*, which they made a genus of the order *Ficoideæ*. Willkomm|| included it in the family *Mollugineæ*. Engler and Prantl,¶ following Endlicher, once more transferred the genus to *Caryophyllaceæ*; and, lastly, Tanfani** made it the type of a subfamily, *Telephineæ*. Its nearest congener is *Spergularia*, from which it is distinguished by the incompletely trilocular capsule and the scarcely opposite leaves. Link†† is the only author who has proposed the genus as the type of a natural family (*Telephiaceæ*), in which also he includes the genus *Corrigiola*. The name of *Telephium* was first used by Dioscorides,‡‡ about the year 60 A.D., and applied by him to the plant now known as *Cerithe major* L. The Latin description is as follows:—"Telephium est herba Portulacææ similis, et caule, et foliis: alas binas in singulis foliorum geniculis annectit: ramuli a radice seni septenive prodeunt, foliis referti cœruleis crassis lentis carnosus: flore luteo, aut candido. Nascitur in cultis, et maxime inter vites tempore verno." Sprengel§§ gives a more exact Latin paraphrase of the Greek original:—"Hoc et foliis et caule Portulacam refert: axillas vero binas habet, singulis foliorum geniculis adnatas, e quibus cauliculi 6 aut 7. Qui vero e radice proveniunt, foliis obtecti sunt crassis, carnosus

* *Gen. Plant.* p. 312 (1789), et ed. Usteri, p. 347 (1791).

† *Mém. Mus. Hist. Nat. Paris*, i. p. 389 (1815).

‡ *Gen. Plant.* p. 956 (1840).

§ *Gen. Plant.* i. p. 857 (1867).

|| *Prod. Fl. Hisp.* iii. p. 167 (1875).

¶ *Die Natürlichen Pflanzenfamilien*, iii. I. p. 85 (1889).

** *Parl. Fl. Italiana*, ix. p. 629 (1893).

†† *Handb. Erk. Gew.* ii. p. 45 (1831).

‡‡ *De Materia Medica*, lib. ii. cap. 217 (*Venice*, July, 1478); translated by

Peter of Abano from the Greek manuscript.

§§ Dioscoridis, *Materia Medica* (1829). See also the various editions of Matthioli's "Commentarii," from 1548 to 1595.

viscosisque; flores sunt albi. Nascitur in vineis locisque cultis." The name of the genus is derived from Telephos, king of Mysia, who was wounded by Achilles, and whose wound was subsequently healed by the application of the rusty point of the spear on which the blood had dried, moistened in the succulent stem of the plant.

Pliny's account was taken from Dioscorides with but slight verbal alteration; and with the issue of the works of ancient writers, which immediately followed the invention of printing, this is the earliest printed book* in which the name is to be found. The paragraph relating to *Telephium* is thus reproduced in Philemon Holland's translation† of Pliny's Natural History, book xxvii, ch. 13:—"As touching *Telephium*, it is an hearbe in leafe and stem resembling Purcellane: immediatly from the root there spring seven or eight small braunches, and those garnished with grosse and fleshie leaves. It loveth to grow in toiled grounds, but principally among vines." The first botanist who uses the name of *Telephium* in its current sense, and applies it to the plant now known as *Telephium Imperati*, is Clusius.‡ The characters of the subfamily and tribe are omitted from the generic description.

TELEPHIUM (*Ord.* Diantales, *Nat. Fam.* Caryophyllaceæ, *Subfam.* Alsinineæ, *trib.* Sperguleæ *Bartl.*).—*Boerhaave*, *Hist. Plant. Lugd. Bot.* ed. 2, p. 356 (1731); *Linn.* *Gen. Plant.* ed. 1, p. 60, n. 172 (1737); *Vir. Cliffort.* p. 20 (1737); *Hort. Cliffort.* p. 73, n. 1 (1738); *Syst. Nat.* ed. 2, p. 21 (1740); *Gen. Plant.* ed. 2, p. 129, n. 298 (1742); *Syst. Nat.* ed. 6, n. 298 (1748); *Gen. Plant.* ed. 4, p. 106, n. 298 (1752); *Gen. Plant.* ed. 5, p. 131, n. 339 (1754); *Syst. Nat.* ed. 10, p. 965, n. 339 (1759); *Gen. Plant.* ed. 6, n. 377 (1764); *Syst. Nat.* ed. 12, p. 220, n. 377 (1767); ed. 13, n. 377 (1774); *Ludwig*, *Gen. Plant.* ed. 2, p. 160 (1747); *Gleditsch*, *Syst. Plant. Stam.* p. 39, n. 156 (1767); *Hill Hort. Kew.* p. 201 (1769); *Scop.* *Introd. Hist. Nat.* p. 330, n. 1518 (1777); *Juss.* *Gen. Plant.* p. 312 (1789); *Gaertn.* *Fruct. Sem. Plant.* p. 221 (1791); *Desf.* *Fl. Atlantica*, i. p. 270 (1798); *Cand.* *Fl. Franç.* iv. p. 400 (1805); *Pers.* *Syn. Plant.* i. p. 329 (1805); *Cand.* *Prodr.* iii. p. 366 (1828); *Bertol.* *Fl. Italica*, iii. p. 499 (Dec., 1838); *Endl.* *Gen. Plant.* n. 5209 (1840); *Ledeb.* *Fl. Rossica*, ii. p. 164 (1844); *Gren. et Godr.* *Fl. de France*, i. p. 608 (1848); *Gren.* *Fl. Chaîne Jurass.* p. 266 (1865); *Benth. et Hook. f.* *Gen. Plant.* i. p. 857 (1867); *Boiss.* *Fl. Orient.* i. p. 753 (1867); *Willk. et Lange*, *Prodr. Fl. Hisp.* iii. p. 167 (1874); *Engl. et Prantl*, *Natürl. Pflanzenf.* iii. 1 b. p. 85 (1889); *Koch*, *Syn. Deutsch. Schweiz. Fl.* Aufl. 3, i. p. 899 (1892); *Parl.* *Fl. Italiana*, ix. p. 629 (1893); *Torre et Harms*, *Gen. Siphonog.* p. 185 (1900); *Thonner*, *Exk. Fl. Eur.* p. 99 (1901).

Sepala 5. Petala 5, in disco obscure perigyno inserta, integra. Stamina 5, sepalis opposita, subperigyna, eorum basi inserta, filamentis subulato-filiformibus compressis; antheræ lineari-oblongæ. Gynœcium meiomere: ovarium ovoideum trigonum apice attenu-

* *Historia Naturalis* (Venice, 1469).

† Pliny's *Naturall Historie*, in 37 Books. p. 290 (1601).

‡ *Rariorum Plantarum Historia*, lib. iiii. cap. 45, p. lxxvii. fig. (Antwerp, 1601).

atum; styli 3, liberi, ima basi autem concreti, patenti-recurvi, breves, intus apices versus stigmatosi; ovula numerosa, placentæ basilari affixa. Capsula chartacea ovato-pyramidata trigona, basi incomplete tricularis, superne unilocularis, valvis 3 medio septiferis dehiscens. Semina plura, in 6 series disposita, reniformi-subcompressa vel globulosa, dorso acutata, testa lævi vel subtiliter granulata. — Herbæ suffruticulosæ, rhizomate duro sæpe perennante, diffusæ carnosulæ procumbentes multicaules glabræ glaucæ. Folia alterna, ovalia vel oblonga, enervia. Cymæ terminales, subcapitatae, vel interdum in dichasiis sat laxis multifloris. Flores parvi, petalis albis. *Species nunc cognoscendæ* 6.

Geographical area of the genus.—The countries round the Mediterranean Sea, Switzerland, Trans-Caucasia, Persia, and Madagascar.

List of the Species.

1. *T. IMPERATI* Linn. Sp. Plant. 271 (1753).
Var. ORIENTALE Boiss. Fl. Orient. i. 754 (1867).
2. *T. OLIGOSPERMUM* Boiss. l. c.
3. *T. SPHÆROSPERMUM* Boiss. Diagn. Plant. or. nov. Ser. i. x. 12 (1849).
4. *T. ERIGLAUCUM*, sp. n.
5. *T. GLANDULOSUM* Bertol. Miscellanea Botanica, i. 18, t. ii. fig. 2 (1842).
6. *T. MADAGASCARIENSE* Baker, in Journ. Linn. Soc. xxi. 347 (1884).

1. *TELEPHIUM IMPERATI*.

Linn. Sp. Plant. 271; Willk. et Lange, Prodr. Fl. Hisp. iii. 167; Rouy et Camus, Fl. de France, vii. 206 (Nov., 1901).*

Perenne. Radix ramosa, fibris paucis albis. Rhizoma crassum lignosum. Caules 1–4 dm., simplices subangulati graciles firmi dense foliati. Folia subunilateralia approximata semper autem evidenter alternantia, ovalia elliptica obovato-oblonga vel oblonga, obtusa, basi attenuata vel in petiolum brevem angustata. Flores in cymas subcapitatas racemiformes scorpioideas dispositi, apice caulium corymbum compactum formantes. Pedunculi furcationem primariam versus parce papillati. Pedicelli basi medioque sæpius squamato-bracteolati; bracteolæ exiguæ albo-scariosæ. Sepala oblongo-lanceolata obtusa concava carinata viridia anguste membranaceo-marginata. Petala paullum infra disci marginem inserta, oblonga tenuia, calyci æquilonga. Stamina petalis calycique æquilonga. Ovarii fornicem versus placenta a 3 filis in stylos prolongata. Capsula nitida, abrupte rostrata, calycem paullulum excedens. Semina 12–18, reniformi-subcompressa, lævia umbrina, $1\frac{1}{4} \times 1$ mm.

North limit.—France: at the foot of the cliffs of Gily, near Arbois, in the department of Jura, where it was found about the

* Of the thirty-six references under the genus, fourteen will also apply to this species. The present description is based on a series of typical examples from the French department of Alpes-Maritimes.

year 1822, by Dr. A. Dumont. Grenier, in his *Fl. de la Chaîne Jurassique*, p. 266 (1865), says that it is the only locality in the Jura* recorded for this plant, which finds its more natural home further away in the south-east mountainous districts of the country, and that in the Jura it is quite an outlying station.

West limit.—Morocco: the Great Atlas range, on Mt. Afonguem, some distance south-west of the city of Morocco, where it was found by Ibrahim, a Moorish collector sent to the district by M. Beaumier, of Algiers, in 1875. There are also specimens from Mt. Tizi-Tagherat, a little further east along the Great Atlas, in herb. Cosson, collected in the same year.

South limit.—Morocco: Mt. Lalla-Aziza,—gathered there by the same native collector in 1883. There are duplicates of all these three gatherings in Herb. Kew.

East limit.—Austria: Val Venosta, in Tirol, from Castelbell to Schulderns, at 750–1200 metres, collected by Haussmann (ex Parl. *Fl. Italiana*, ix. p. 680 [1893]). Examples from the same locality in Herb. Kew. (*Facchini*, 1852).—Within these limits the type of the species (as distinct from var. *orientale*, which has a different distribution altogether) is found also in Spain, the republic of Andorra, Switzerland, the Alps of Piedmont, and Algeria.

Spain.—Widely distributed in the northern, central, and southern provinces,† in sandy and gravelly stations at various altitudes, chiefly in the region of olives, from Celda in Aragon (Willkomm, *Prodr. Fl. Hisp.* i. p. 168) to the Sierra de Gador, in Andalusia, at 1800 metres (Boissier, *Voyage Botanique dans l'Espagne*), and Guegar in the Sierra Nevada (Winkler, 1876, in Herb. Kew.); and from Barcelona, in Catalonia (Salvador), to Colmenar de Oreja, in New Castile (Cutanda, *Fl. de Madrid*, 1861, p. 300). Willkomm obtained specimens on the Sierra di Maria at 2000 metres.

France.—Widely distributed in the southern part of the country: from Arbois in the department of Jura (see above) to the department of Pyrénées-Orientales, between Olettes and Mt. Louis (Herb. Kew.), and the Val de Nyor (Gren. et Godr. *Fl. de France*, i. p. 609); and from Saorge in the department of Alpes-Maritimes (herb. Lisa, 1854) westward to the environs of St. Sever, in the department of Landes (J. Thore, *Essai d'une Chloris du département des Landes*, 1803, p. 113). It is also found in the following departments:—Hautes-Alpes (in the Val Louise, J. Stuart Mill,‡ 1859, and at Briançon, Jordan, both in Herb. Kew.), Basses-Alpes, Drôme, Lozère, Vaucluse, Bouches-du-Rhône (Pena et Lobel, *Stirp. Advers. Nova*, 1571, p. 405 §), Var, Gard, Hérault (four out of the six speci-

* Godet, *Fl. du Jura*, p. 244 (1852), says also that J. Thurmann sent him a specimen which he gathered below the vineyards of Gily.

† Apparently occurs also in the Balearic Isles, as Colmeiro gives as a local name for the plant, “*faba crasa rastreira*.”

‡ The famous rationalist's extensive collection of plants made in the south-east of France, with localities and dates carefully recorded on all the specimens, seems to have remained unnoticed by the authors of various French local floras.

§ This is the earliest known record for the plant. Jacques Reynaudet, an apothecary, found it near Aix, on the rocky ledges of Mount St. Bonaventure (Mont St. Victoire), and gave specimens to Pena when he was travelling through the district, who first described the plant in the work cited.

mens preserved in Herb. Sloane probably came from here originally), Aveyron, Aude (n. 18, ex herb. Pallas, from Narbonne, in Herb. Mus. Brit.), Hautes-Pyrénées. Rouy and Camus (*Fl. de France*, vii. p. 206 [Nov., 1901]) omit the department of Alpes-Maritimes in their brief account of its distribution; for fuller list of localities see Burnat, *Fl. des Alpes-Maritimes*, iii. 221 (Mars, 1899).

Italy.—Recorded only from a few places in the Alps of Piedmont: at Briga and in the district of Tenda, in the Maritime Alps (*Ardoino*); along the Valle della Dora Riparia, in the Cottian Alps, at Susa (*Huguenin, Bonjean*, in Herb. Kew.), Mompantero (*Parlatore*), Brunetta (*Allioni*, *Fl. Pedem.* ii. p. 207, n. 1682 [1785],—the earliest definite record of the plant in Italy), and Giaveno (*Re*).

Switzerland.—Confined only to the canton of Valais. There are specimens in Herb. Mus. Brit. from Sion, and Saillon, 1835 (ex *Leresche*, 1837), St. Léonard (*Haussknecht*), and in Herb. Kew. from Visper-Terbinen above Visp, in Upper Valais, along the road to Riedbach, at an altitude of 1000 metres, on schistic soil (*Brügger*, 1861), and also from Lower Valais (*Favrat and Barbey*, 1872, Herb. Helvet.). The other places where the plant is to be found are,—the ascent from Randa to Täsch, along the rack-and-pinion railway, not far from Täsch station (the only place where I have seen it growing myself), Bitzenen, Les Pontis, Vercorin, Erschmatt, in pine-woods along the Dala ravine between Inden and Loèche-les-Bains, and above the road from Inden to Sierre, in the vineyards round Conthey, not far from the boundary wall which separates Valais from Vaud, Riddes, Aven, and Erdes; these latter on the way to Sion. Schinz and Keller (*Fl. d. Schweiz*, ed. ii. 1905, p. 188) curiously give “Kaiser-Telephium” as a popular (?) name for the plant, evidently confusing *Imperati* with “Imperatoris.” Thonner (*Exkurs. Fl. Eur.* p. 99) calls it “Zierspark” (*i. e.*, “graceful spurrey”), apparently to distinguish it from the less attractive *Spergula*, though the source of this evidently coined name is obscure.

Algeria.—Sid-el-Hadj-ed-Din (Ouled Sidi-Sheikh), 38° 7' N., 3° 20' W., north of the Habilat Plain, in the Algerian Sahara (Paris, *It. boreali-africanum*, 1866, n. 58, in Herb. Kew.); Sidi-bel-Abbes, in the province of Oran (Munby, 1856, *Cent.* iii. n. 96, in Herb. Kew.); El May, in the hinterland of the Oranian Sahara (*Warion*, 1868, in Herb. Kew.); near Ghardaïa, in the oâsis of the Wady Mzab, Algerian Sahara, 1902 (Abbé Chevallier in *Bull. Herb. Boiss.* 1903, p. 673). Battandier and Trabut (*Fl. de l'Algérie* [1889]) do not give any localities for the plant, and make an odd remark about the hypothetical *T. oppositifolium* Linn., which will be referred to further on.

Among the old specimens preserved in Herb. Mus. Brit. are the type-specimen (a luxuriant example) described in Linnæus' *Hort. Cliffort.* p. 73; a Chelsea Garden specimen (n. 1645), which was one of the contract-plants sent by the Curator to the Royal Society in 1754, and six specimens in as many volumes of the Sloane Herbarium (consisting of 334 volumes). These last, however, are of little interest, as none of them are labelled, either with locality or

date. As to these six specimens,—(1) in vol. 12, fol. 129, grown by Plukenet in the garden of Hampton Court Palace; (2) in vol. 46, fol. 51, an English garden specimen grown about 1660; (3) a specimen (n. 27) from Magnol's garden at Montpellier; (4) in vol. 83, fol. 84, gathered by Plukenet, probably in the south of France, as he obtained a medical qualification at Montpellier; (5) in vol. 166, fol. 166, sent to Petiver from the neighbourhood of Montpellier; (6) in vol. 171, fol. 179, a garden specimen referred to by Petiver, with a printed label from his paper in *Phil. Trans. Roy. Soc.* xxviii. 94 (1714), with a note that "it grows in Narbone on steep rocks and precipices."

Var. ORIENTALE.

Boiss. Fl. Orient. i. 754 (1867); *Raulin, Descr. Bot. Crète*, 723 (1869).

Folia minora plerumque angustiora, superiora elliptico-linearia, acutiuscula rarius obtusa. Flores subminores densius congesti. Sepala paullum angustiora, oblongo-linearia, intus minus concava. Capsula superne attenuatim rostrata, calyce $\frac{1}{3}$ parte nec paullum longior.

Hab. Greece, Crete, Cyprus, Asiatic Turkey, Persia, and the Trans-Caucasian province of Talysch on the Caspian Sea.

North limit.—Asiatic Turkey; above the citadel of the city of Amasia, in the vilayet of Sivas, at 500 metres above the sea (Bornmüller, *Pl. Anatoliæ orient.* 1890, n. 2642, in *Herb. Kew.*).

South and east limits.—Persia: Mt. Gelu* in the province of Khuzistan (*Kotschy, Pl. Pers. austr.* 1842, n. 513, in *Herb. Kew.*), long. $50^{\circ} 30'$.

West limit.—Greece: Mt. Pindus, on Mt. Ghavellu, in the eparchy of Kalabaka, nome of Trikkala, in the subalpine region (*Hausknecht, Symbolæ Fl. Græc.*, in *Mittheil. Thüring. Bot. Ver.* 1893, p. 104), where it was collected in 1885, in long. $21^{\circ} 35'$. The distribution within these limits is given hereunder in detail.

Greece.—Mt. Pindus (as above); Mt. Liakura (Parnassus) in the nome of Phthiotis and Phocis (*Guicciardini*); Mt. Ziria (Kyllene), in the nome of Argolis and Corinth, at 1800 metres (*Heldreich*,

* It is unfortunate that Boissier so often copied the geographical names on the labels of collectors' specimens, as written (or printed), direct into the *Fl. Orientalis*, without either consulting a gazetteer or studying good maps, and thereby verifying the localities given for the specimens of various collectors. The names are so often spelled wrong in the distributed sheets of *Exsiccatae*, that it is difficult to run them down, even on good maps, when the geographical name given is not only different in form (probably phonetic), but is different in the initial letter from the name as given in official maps. This is the more confusing in the case of the statement that a stream or a Turkish village is in "Pamphylia" or "on the confines of Cappadocia." Such location of small places (often not marked in the best charts and maps) conveys no information. It would have been so easy to have modernized the details of distribution, and to have stated specifically in which of the Turkish vilayets or sandjaks, or even mudiriehs, the locality is situated. In the present instance the name of Mt. Gelu is printed on the label of the type-specimens as "Kuh-Delu," so that a long search through an index would be fruitless. If the initial letter of the name on the label is correct, the locality can often be guessed on reference to a good map.

1848, in Herb. Kew.); Mt. Parnon (Malevo), in the nome of Arcadia (*Orphanides*); Mt. Pentedactylon (Taygetos), in the nome of Laconia (*Zahn*); island of Melos (Milo), in the Cyclades (*Prof. Tooley*, 1841, in Herb. Kew.—neither referred to by Boissier, nor in Halacsy's Flora). The modern Greek names of the mountains and of the nomarchical divisions are taken from the new edition of Baedeker's *Guide to Greece* (1904).

Crete.—In the Aspro-Vuna Mountains, at Hellinoseli (*Raulin*), and on the Homalo Plateau (*Baldacci*, It. Creticum, 1893, n. 59, in Herb. Kew.) in the district of Khamistiria; also in the Sphakiote range on Mt. Volakia (*Heldreich*, *Baldacci*).

Cyprus.—Mt. Troodos (*Sintenis & Rigo*, It. Cyprium, 1886, n. 719, in Herb. Kew.),—the Cypriote Olympus.

Asiatic Turkey.—Vilayet of Constantinople: Mt. Fola, in woods above Jaellem (*Sintenis*, It. Trojanum, 1883, n. 655, in Herb. Kew.). Vilayet of Smyrna: central part of Mt. Sipuli, above Manissa (Magnesia), on the Tmolus range (*Balansa*, Pl. d'Orient, 1854, n. 355); on Mt. Sipuli (*Aucher-Eloy*, n. 2816); on the hills of Elmalu (*Bourgeau*, Pl. Lyciæ, 1860); on the hills above Smyrna (*Boissier*); mountains above Budrum (Halicarnassus) in south-west Anatolia (*Pinard*, 1843). Vilayet of Karamania: Mt. Taurus (*Heldreich*), Bouldous (*Heldreich*, 1845),—all these in Herb. Kew. Vilayet of Sivas: above the citadel of Amasia (*Bornmüller*). Vilayet of Khodavendikiar: on the Bithynian Olympus (*Noë*, 1848). Vilayet of Adana: Mt. Taurus, near the defile of the Cilician Gates (*Balansa*, Pl. d'Orient, 1855, n. 764, in Herb. Kew.); Mt. Taurus (*Kotschy*, 1836, n. 578, and *Siehe*, It. Tauricum, 1895, n. 51,—in Herb. Kew. and Herb. Mus. Brit.). Vilayet of Erzeroum (*Huet*, 1853, *Zohrab*, n. 494). Vilayet of Aleppo: Aïn-Tab, in the Eastern Taurus (*Kotschy*). Vilayet of Tripoli: Mt. Amanus (*Haussknecht*). Vilayet of Diarbekir: at Kasni, on the slopes of the Mardin hills (*Sintenis*, It. Orientale, 1888, n. 1105, in Herb. Kew.). Vilayet of the Lebanon: at the cedars of Lebanon (Pl. Libanoticæ, 1878, n. 895, in Herb. Mus. Brit., and *Boissier*, in Herb. Kew.); Anti-Lebanon (*Gaillardot*, in Herb. Kew.); Mt. Baruk, at 1500–2100 metres (*Ball*, It. Orientale, 1877, n. 2001, in Herb. Kew.).

Asiatic Russia.—Trans-Caucasian province of Talysch: in dry, hard, stony places in the mountainous portion of the Suwant district (*C. A. Meyer*, Verz. Reis. Caucas. Casp. Meer., 1831, p. 155; *Hohen*. Enum. Plant. Prov. Talysch, 1838, p. 118; *Ledeb.* Fl. Rossica, ii. [1844] p. 164; *Trautv.* Incr. Fl. Rossicæ, p. 304, n. 2112 [1883]; *Lipsky*, Fl. Caucasica, p. 256 [1899],—in Russian).

Early History of T. Imperati (1571–1699).

1571.—As mentioned above, the earliest record of the plant is that of Jacques Reynaudet, an apothecary of Aix, in Provence, who gathered the plant on Mt. St. Bonaventure (Mont St. Victoire), and gave specimens to Pena. Pena and Lobel* describe the plant

* *Stirpium Adversaria Nova*, 405, with fig. (prefatory dedication to Queen Elizabeth, dated London, December 24th, 1570); ed. 2, *Anticerp*, 1576 (with the dedication to Queen Elizabeth left out, and a short appendix added by Rondelet).

as "*Helianthes species rara, figura leguminosa, floribus aureis*," and this is their original description:—"Non perinde formosam icone hanc, atque nativa facie dono misit nobis hanc noster industrius et peritus Pharmacopœus Jacobus Reynaudet, quam e jugis arduis montis D. Bonaventuræ, non procul Aquisextiis eruerat. Radice lignosæ fruticulæ, cervicem paulum inflexam habente, superne et inferne nodosam, e qua emergunt viticuli palmares juncei, recti, flexiles albidii, foliolis Lentis aut Coluteæ Scorpioidis ex glauco virentibus, ab imo summo tenuis stipati: floribus aureis et calyculis *Helianthes vulgaris*: semine autem non dispari, pusillo Cisti Ledi, amaro gustu." Pena clearly draws attention to the stipulate leaves, but describes the flowers as yellow, having examined only dried specimens in which the flowers were crumpled up and discoloured.

1581.—Next figured in Lobel's* famous volume of plates (issued from the Plantin Press at Antwerp, without descriptions), with a dedication (by the printer) to Dr. Severin Gobel, dated June 1st, 1581. It is the same woodcut as in the last, but a blacker impression and under another name, "*Cistus folio Majoranæ defluxis floribus*."

1588.—Described by Camerarius† from examples grown in the Botanic Garden at Naples, and evidently distributed from there among working botanists by Imperato, before he had undertaken his own illustrated work on plants. The description is in a form somewhat different from that of Pena:—"Telephium Ferdinandi Imperati Neapolitani pharmacopœi peritissimi. Calor, quem in hac planta requirunt veteres, radicem potissimum gustantibus deprehenditur. Perit superiore hyeme, cum ante hac plurimos annos duraverit, semine tamen sponte excidente plurimum se rursus propagavit. Cauliculi supini foliis amiciuntur Portulacæ sed tenuioribus flosculos fert stellatos albicantes, in summitate confertos, quibus succedunt nigra semina in capsulis."

1596.—Catalogued in C. Baubin's‡ early sketch of his great work, under the name of "*Sedum n. 25, flore stellato*," with the synonym added of "*Telephium Imperati*," which is the first use of the actual binomial form of the name of the plant as taken up by Linnæus.

1599.—Figured by Ferranto Imperato§ from examples grown in the Botanic Garden at Naples, but without any description, and under the impression that it was the true *Telephium* of Dioscorides—"Telephio di Dioscoride." In the second edition of the work, the reader is referred to Clusius' description for further information about the plant.

* *Plantarum seu Stirpium Icones*, ii. 115; reprinted in 1591, with the title altered to *Icones Stirpium*.

† *Hortus Medicus et Philosophicus*, 167; issued bound up with Thal's *Sylva Hercynica*.

‡ *Phytopinax*, lib. vii. sect. 5.

§ *Historia Naturale*, p. 872, fig. (Naples); ed. ii. p. 662 (Venice, 1672), with some of the irrelevant matter of the first edition omitted, and references given to Clusius and other authors of the seventeenth century.

1601.—Clusius* gives the first clear description of the plant, pointing out that it is not the true “*Telephium*” of Dioscorides, but another plant altogether, though, as he thought, of the same genus:—“*Septimum Telephii* genus, mihi Viennæ Austriæ natum anno mxxxv semine Florentia misso à Josepho de Casa bona: postea etiam Francofurti ad Moenum crevit Joanni Mylero Pharmacopæo semine, quod acceptum Neapoli à Doctissimo humanissimoque viro Ferrante Imperato *Telephii* legitimi nomine ipsi communicabam: ex cujus Myleri horto plantam unam eruebam, quam pictori exprimendam darem. Siccam verò hujus plantam etiam ad me Francofurtum mittebat cum aliis stirpibus Amplissimus vir Jac. Anto. Cortusus, Ignotæ adscriptâ notâ, quam tamen apud eos frequentem in hortis nasci assereret.—Multas autem à summo radice capite producit tenues virgas, summâ tellure diffusas, pedales, interdum breviores, aliquando longiores, non sunt enim omnes æqualis longitudinis, quas incondito ordine sepiunt multa folia, præsertim novellas, et quæ nondum florem ferunt (nam quæ flores dant, rariora plerumque habent folia) minora quam reliquorum generum, minus crassa, neque adeo succulenta, neque adeo fragilia, coloris quidem viridis, cui ærugineum quidpiam admixtum sit: extremæ virgæ, multis flosculis quinque foliolis albis constantibus, et confertim nascentibus, onustæ, quibus marcescentibus succedunt angulosa vascula exili, fusco semine plana: radix minimi digiti crassitudinem interdum acquirit, lenta, candicans, in aliquot ramos divisa, et quibusdam fibris donata, vivax, et singulis annis plures novas virgas producens, veteribus corruptis. Floret cum *Crassulis*.”

1623.—C. Bauhin,† following Clusius, enumerates seven species. Although he cites the genus as of Dioscorides and Pliny, he so far misconstrues these ancient authorities in that he does not include among these seven species the true *Telephium* of Dioscorides, which had been identified and figured seven years before by Fabius Columna‡ under the name of “*Telephium Dioscoridis et Plinii*”; but which Bauhin calls “*Capparis portulacæ folio*” (p. 480). Of the seven “species” of *Telephium* given by Bauhin, the first three are *Sedum telephium* L., n. 4 is *Sedum maximum* Suter, n. 5 is *Sedum anacampseros* L., n. 6 is *T. Imperati*, and n. 7, which Bauhin wrongly believed was the true *Telephium* of Dioscorides, is *Coronilla scorpioides* Koch. N. 6, to which Bauhin gives the name of “*Telephium repens folio non deciduo*,” includes the synonyms of Camerarius and Clusius. The same plant occurs again later on in the work under *Cistus* (p. 465) as “*Cistus folio Majoranæ*”; so that Bauhin was not particularly fortunate in his conception of this genus. He would not have fallen into error had he correctly applied Dalechamp’s § description, which is as follows:—“*Aliam*

* *Rariorum Plantarum Historia*, tom. 2, lib. iiii. cap. 45, p. lxxvii, cum fig. (Antwerp).

† *Pinax*, p. 286 (Basel, 1623).

‡ *Ecphrasis*, i. p. 132, t. 131 (Rome, 1616).

§ *Historia Generalis Plantarum*, lib. vii. cap. 40, p. 869, cum fig. (Leyden, 1587).

Helianthes speciem raram pingendam curavit Pena, ex jugis arduis montis D. Bonaventuræ, non procul Aquis-sextiis erutam, radice lignosa, paullum inflexa, superne et inferne nodosa, e qua emergunt, viticulæ palmares, junceæ, rectæ, flexiles, albidæ, foliolis lentis aut coluteæ scorpioidis, ex glauco virentibus ab imo summo tenus stipatæ, floribus aureis et caliculis *Helianthes* supra descriptæ: semine autem non dispari, pusillo. Cisti ledi, amaro gustu."

1633.—The first English description was published by Thomas Johnson,* who calls the plant "creeping orpyn," its only English name. He says:—"Clusius received the seeds of this from Ferranto Imperato of Naples, under the name of *Telephium legitimum*; and he hath thus given us the history thereof: It produces from the top of the root many branches spread upon the ground, which are about a foot long, set with many leaves, especially such as are not come to floure; for the other have fewer: these leaves are smaller, lesse thick also and succulent than those of the former kindes, neither are they so brittle: their colour is green, inclining a little to blew: the tops of the branches are plentifully stored with little floures growing thick together and composed of five little white leaves apeece: which fading, there succeed cornered seed vessels full of a brownish seed. The root is sometimes as thicke as ones little finger, tough, white, divided into some branches, and living many yeares." Clusius's figure is reproduced.

1651.—Jean Bauhin gives a very full description of it under the name of "*Helianthes species rara*," † which need not be transcribed, as it is merely compounded of the descriptions of previous authors, without discriminating any new characters. He says that Jacques Reynaudet sent it from Provence to various botanists, "*primum nomine plantæ repentis, ut Nummularia secundo stirpis Veronicæ modo repentis*."

1688.—First definite record of its occurrence in Spain about this year, by Jaime Salvador y Pedrol (1649–1740), who gathered it in the Catalonian mountains, according to specimens preserved in the family herbarium at Barcelona. It is possible also that the English garden specimen in Herb. Sloane, vol. 46, fol. 51, gathered about 1660, came originally from Spain.

1696.—In the last of the pre-Tournefortian digests, Plukenet ‡ refers the plant to *Alsine*, and in this catalogue it appears as "*Alsine Scorpioides procumbens major Telephii facie tricapsularis*." He, however, gives no further information about it, except a few synonyms.

Bubani§ proposed to alter the generic name to *Reynaudetia*, as *Telephium* has, since the time of Dioscorides, been applied to so many different genera and their species; *e. g.*, to several species of *Sedum*, *Cotyledon*, and *Kalanchoë*. Guilandinus, in 1557, and

* In his edition of Gerard's *Herbal*, p. 519 (London, 1633; reprinted as a second edition, without alterations, 1636).

† *Historia Plantarum*, ii. p. 20, cum fig. (Yverdon, 1651).

‡ *Almagestum Botanicum*, p. 20 (London).

§ *Fl. Pyrenæa*, iii. p. 17 (1901).

Cesalpini, in 1583, include *Coronilla scorpioides* in *Telephium*, of which Bauhin approves. Andrea Lacuna, in a Spanish commentary on Dioscorides (1552), includes *Cochlearia officinalis*, and later on Buxbaum includes *Honkenya peploides*. Several of the old botanists thought they identified the plant of Dioscorides with the genus now known as *Cerinth*. As Balog, an Hungarian herbalist, points out, it is one of the species of this genus which is figured for *Telephium* in the famous Byzantine Codex of Dioscorides (referred to in the postscript), preserved in the Imperial Library of Vienna (see Baedeker's *Guide for Austria*, 1896, p. 18). This Codex was printed in phototype a few months ago, and in a most sumptuous style, bound in ornamental wooden covers. Dalechamp mentions that certain botanists again thought they identified it with the plant now known as *Sisymbrium Thalianum* J. Gay. With the view of clearing up the apparent confusion, Bubani proposed to call the present plant *Reynaudetia mediterranea*, which, if it were only feasible, would be very suitable, having regard to its distribution.

Morison,* who knows nothing about the plant, and does not seem to have seen any specimens, puts it in another genus altogether, and briefly describes it as “*Polygonum perenne procumbens folio brevior, floribus in capitulum congestis*”; and then gives an involved description of some length, compounded of those of J. Bauhin and Ray.

Those who regard Tournefort's *Institutiones Rei Herbariæ* as the starting-point of modern genera (and they are an increasing number of systematic botanists) cannot cite this authority for *Telephium*, as one of the chief characters which he gives—“*flore rosaceo, plurimis scilicet petalis, in orbem positis constante*”—radically impairs the concept of the genus as now understood. Tournefort evidently took up the name in the sense in which it was first used by Dioscorides; and of the four ‘species,’ the first only applies to *T. Imperati*. Boerhaave's original description of the genus is as follows:—“*Caules crassi, rotundi, politi, in parte inferiori rubicundi; folia alterna, carnosa, crassa, in margine incisa, succulenta; post florem sequitur fructus triangularis semina fere rotunda includens; radix in plurima tubercula alba divisa.*” Scopoli, in 1777, with a rare insight into the affinities of genera, was the first to group several genera (of which *Telephium* was one) into the natural family of *Caryophyllæ*, which he clearly defined, and of which he gave the essential characters common to all the genera included. He thus anticipated Endlicher and later systematists.

Two other references to the plant between the time of Tournefort and Linnæus are also of interest. A confirmation of the original record near Aix is made by Garidel,† from which the following excerpt is translated:—“This plant is found on Mt. St. Victoire, also at the foot of the same mountain on the north side, near Moulin de Roques-Hautes and St. Antony's Castle; it descends also into the Pourrières district along the Valley of

* *Historia Plantarum Universalis*, iii. p. 593 (Oxford, 1699; this volume edited by Bobart).

† *Hist. Pl. env. d'Aix*, p. 456 (1715).

Vaumaro,* also in the wood of Roquefueil, and below St. Baume." All these places seem to be in the department of Bouches-du-Rhône. In Miller's *Gardeners' Dictionary*, the plant first appears in the third edition (vol. ii, 1739) as "A native of Italy, Spain, and the southern parts of France, from whence the seeds have been procured by some persons who are curious in Botany; who preserve it in their gardens for the sake of variety; it is a low plant, whose branches trail on the ground; the leaves are small and roundish, of a glaucous colour, and of a pretty thick consistence; the flowers are small, and of a whitish green colour; so that the whole plant makes but an ordinary appearance."

Synonymy of T. Imperati.

Merophragma terrestre Dulac, Fl. dep. Hautes-Pyrénées, 365 (1867).—Dulac, like Bubani, disapproves of the current generic name, and substitutes this for it. He places it in the family *Gracilicaulaceæ*, a name which he proposes for *Paronychiaceæ*. Dulac's Flora is remarkable for its revolutionary ideas on the subject of nomenclature, a disturbing element that seems to have inspired several Pyrenean Floras—such as Lapeyrouse's, Bentham's, Dufour's, Bubani's, and to a lesser extent those of Noulet and of Timbal-Lagrave.

T. album Güldenstädt, Reis. Russl. Cauc. (ed. Pallas) ii. 209 (1791).—This is a name only, without any description, and without any indication of what plant is intended. It is very doubtful whether it can apply to *T. Imperati*, as it is far out of the limits of this species, and is one of a list of plants stated to be found on a nitrate soil in the governments of Kiew and Poltawa, between the rivers Orel and Verestowaja, which renders its identity still more obscure. Trautvetter (*Incr. fl. Rossicæ*, p. 303, n. 2111) repeats the name as an 'addition' to the Russian flora, but gives no further information about the plant.

T. alternifolium Moench, Meth. Pl. Marburg. 231 (1794).—The Linnean specific name did not commend itself to the author.

T. oppositifolium Linn. Sp. Plant. ed. 2, 388 (1762).—There is no doubt whatever that this is *T. Imperati*. Linnæus marks it with a cruciform obelisk (†), which indicates either that it is a doubtful species or a plant unknown to him, except by description. The Linnean species is based upon the figure and description of a plant collected by Thomas Shaw somewhere in North Africa or the coast district of Western Asia. The plants of this collection were examined and enumerated by Dillen in a separately paged appendix to Shaw's *Travels in Barbary and the Levant* (1738), with a separate title, "Catalogus Plantarum quas in variis Africæ et Asiæ partibus collegit," p. 46, n. 572, c. fig. (several plants figured on a page, and each page of figures inscribed to an Oxford worthy of the time). The type-specimen is among Shaw's plants preserved in the Oxford herbarium. The figure represents the upper part of a flowering-stem, and is certainly *T. Imperati*, in which the upper leaves under the

* This is given in the Provençal dialect as "Lou valon de Vaumaro."

cyme are often opposite. Mr. G. C. Druce has kindly examined the type-specimen, and assures me that the fragment was probably used for the drawing, judging from its facies, but that there is no note or indication of its origin beyond its number of 572, and the printed slip cut out of the Catalogue. Dillen's description is as follows:—" *Telephium* Myosotidis foliis, amplioribus conjugatis. Summitates ramulorum Heliotropio instar reflectuntur. Florum petala parva sunt; vascula simplicia; trivalvia; plura semina continentia." The collection of plants was made about 1720. Battandier and Trabut, in their Algerian Flora, cite the plant as "*Telephium oppositifolium* Shaw," and naïvely assert that no one has seen the plant since Shaw. Though Linnæus met Shaw in the course of his visit to Dillen, at Oxford, in 1736, it is hardly likely that he went through Shaw's collection. All the details have here been gone into, as it is a serious matter to drop definitely a Linnean species.

T. repens Lamk. Fl. Française, iii. 71 (1778).—Like Moench, Lamarck disapproves of the Linnean specific name, which he misspells "*Telephium impetrati*."

2. TELEPHIUM OLIGOSPERMUM.

Boiss. Fl. Orient. i. 754.

Perenne. Caules simplices teretes erecti firmi foliosi. Folia 25–37 mm. longa, 4 mm. lata, elongata lineari-lanceolata acuta, basi attenuata, nervo medio subtus prominente. Flores in cymas subcapitatas congesti. Pedicelli basi medioque sæpius squamato-bracteolati; bracteæ minutæ albo-scariosæ. Sepala late linearia acuta planiuscula carinata, sat late præsertim apicem versus membranaceo-marginata ibique cucullata. Petala oblongo-linearia tenuia, calyce paullulum breviora. Capsula nitida, sensim in rostrum acutum attenuata, calyce $\frac{1}{3}$ parte longior. Semina plerumque 6 (vel 8), $1\frac{1}{4} \times 1$ mm., reniformi-subcompressa, punctata vel subtiliter granulata, umbrina.

Hab. Asiatic Turkey: Mt. Kara,* in the vilayet of Mosul, between the River Tigris and the River Shirwan, in stony places (*Kotschy*, Pl. Alepp. Kurdistan. Mosul. n. 320, 1841).

Described from authentic type-specimens; all of those which are available being cut off above the rhizome. Boissier says that the seeds are smaller than those of the preceding species: but seeds from each placed together under a lens (and measured) seem to be of exactly the same size. Boissier also says that the capsule is longer than the calyx by a fourth part; it is certainly more exserted than this in the specimens.

3. TELEPHIUM SPHÆROSPERMUM.

Boiss. Diagn. Plant. Or. Nov. Ser. i. x. 12.

Annuum vel bienne. Caules 5–15 cm., abbreviati filiformes simplices foliosi. Folia 6–8 mm. $\times$ 3–4 mm., oblongo-elliptica,

* Not "Gara" as given on the printed labels of all the specimens. There is no such place as Mt. Gara.

basi attenuata, nervo medio subtus obsoleto, radicalia majora breviter petiolata, caulina subunilateralia subsessilia. Flores in cymam parvam e ramis 2-4 constanter aggregati. Sepala oblongo-lineararia anguste membranaceo-marginata. Petala paullum infra disci marginem inserta, oblonga, calyci subæquilonga. Capsula nitida, breviter ovata, erostris, calyce brevior. Semina 25-30, perspicue globulosa, umbrina.

Flowers smaller than those of *T. Imperati*; and differs from it otherwise in being annual or biennial, in the fruit not beaked, and in the smaller seeds, which are distinctly globular not reniform-compressed. Boissier also notices a f. *racemosa*, "forsan sub-monstrosa," in which the branches of the cyme are elongated, so that the flowers are more loosely arranged at the top of the stem, making the plant somewhat different in habit, though connected by intermediates with the type. In this laxer form the bracteoles on the pedicels are more readily seen, though they are smaller than those of *T. Imperati*.

Hab. Egypt: the Arabian Desert of Upper Egypt (*Willkomm*, 1854, in *Herb. Mus. Brit.*; *Tregari*, 1847, in *Herb. Kew.*; *Husson ex Boiss.* in *Herb. Kew.*), Jebel Am-Sidr (*Schweinfurth*, 1880, n. 57, in *Herb. Kew.*), Wady Hebran (*Schimper*, *Pl. Arab. Petrææ*, 1835, n. 346, in *Herb. Kew.*), Wady Ashar, on the Gulf of Suez (*Schweinfurth*, 1887, in *Herb. Mus. Brit.*), Wady Narag (*Schweinfurth*, 1877, n. 73, in *Herb. Kew.*; this is the "Ouadi Natfe" of Boiss. *Fl. Orient. Suppl.* [1888], p. 123). It is not recorded from Lower Egypt, but occurs in the Sinai Peninsula (Egyptian territory) at Wady Sheikh (ex *Boissier*, and *J. K. Lord*, 1868, in *Herb. Kew.*). Barca (Turkish province): at Wady Dernah on the coast (*Taubert*, *It. Cyrenaicum*, 1887, n. 44, in *Herb. Kew.*).

4. *Telephium eriglaucum*, n. sp.

Perenne, cæspitosum. Caules 5-7 ctim., gracillimi filiformes simplices tenues, sat nec crebre foliosi. Folia $4\frac{1}{2}$ -6 mm., intense glauca, ovato-elliptica attenuato-petiolata obtusa. Cyma circiter 6 florum; pedicelli basi medioque sæpius squamato-bracteolati; bracteæ exigue minutæ albo-scariosæ. Sepala oblongo-lineararia, valde carinata, anguste membranaceo-marginata. Petala oblonga, calyce paullulum breviora. Capsula rostrata, rostello excepto inclusa. Semina 14-18, evidenter globulosa, brunnea, minuscule.

Hab. Persia: on hard rocks, on the hill overlooking the city of Shiraz, about 100 metres above the tomb of the poet Sâdi, in the province of Fars. Described from specimens in *Herb. Kew.*, collected in 1885 by Dr. O. Stapf. A plant, both in facies and in general characters, quite distinct from any of the other species of the genus. The specific name is based on the intense glaucous colour of the leaves, *ηρι-* being an intensive prefix.

5. *TELEPHIUM GLANDULOSUM*.

Bertol. *Miscellanea Botanica*, i. 18, t. ii. fig. 2.

Perenne. Caules 12 ctim., teretes, inferne glabrî, superne glandulosi, foliosi. Folia obovata longiuscule petiolata. Cyma

brachiato-candelabriformis, pedunculis foliaceo-bracteatis. Calyx glandulis numerosis adpersus; sepala oblongo-linearia obtusa carinata anguste membranaceo-marginata. Petala obovata, longe unguiculata, calyce multo longiora.

Hab. Asiatic Turkey: mouth of the River Euphrates, in the vilayet of Basrah. Among the collection of plants made by General F. R. Chesney, in 1837, in the course of his exploration of the Euphrates Valley; most of which (including the present plant) were sent for examination to Bertoloni, and placed in the herbarium of the University of Bologna, where they are now. Overlooked by Boissier in *Fl. Orientalis*, and not subsequently referred to by any other authority on the Flora of the East.

Bertoloni gives a good coloured plate of the plant, and has labelled the type-specimens, "Pl. sicc. Euphratis, n. 149." It is at once distinguished from the other species by the glandular cyme and long exserted petals.

6. TELEPHIUM MADAGASCARIENSE.

Baker in Journ. Linn. Soc. xxi. 347.

Perenne, habitu laxiusculum. Caules 15 ctim., subangulati foliosi. Folia 12–18 mm., leviter glauca, oblonga obtusa basi attenuata. Flores in dichasia multiflora sat laxa dispositi. Pedicelli basi medioque bracteolati, flore dichotomiali ebracteato; bracteolæ exiguæ deltoideæ, scariosæ vel late scarioso-marginatæ. Calyx 3 mm., corollæ andrœcioque æquilongus; sepala oblonga obtusa, extus rotundata haud carinata, omnino herbacea nec membranaceo-marginata. Petala oblonga, in nonnullis floribus paullulum exserta. Antheræ oblongæ. Gynœcium calyce brevior.

Described from the type-specimens in Herb. Kew. (*Baron*, 1883, n. 1909), with additional characters not given by Mr. Baker. No capsules are available for examination, as no portion of the available material is in fruit.

Hab. Central Madagascar: confined to Mt. Ankaratra, in the province of Imerina, the highest mountain in the country, twenty to thirty miles to the south-west of the capital, on a volcanic soil composed of basaltic lava. This exact locality is not noted by Mr. Baker, nor is it marked on the specimens, but is given in a later summary of the flora of the country by Rev. R. Baron.

Iconography of the Species.

T. IMPERATI *Linn.*—*Lamk.* Encycl. Méth. Illustr. Gen. iii. 213 (1783–1808); *Schkuhr*, Bot. Handb. Deutschl. Gew. i. p. 247, t. 85 (1791–1801),—upper part of flowering-stem, with analysis of floral organs; *Gaertn.* Fruct. Sem. Plant. 129 (1791); *Le Maout & Decaisne*, Gen. Syst. Bot. 643 (Engl. ed. *Hook. f.*, 1873),—woodcut of plant, with analysis of floral organs; *Wildeman*, Icones Selectæ Horti Thenensis, p. 161, t. 157 (Dec. 1903),—an excellent plate, with a good figure of the plant, and careful dissections and analyses of flower and fruit drawn direct from the living specimen. There are also woodcuts in a few local floras which need not be referred to or cited, as they are of no importance.

Var. ORIENTALE Boiss.—*Tchihat*. Asie Mineure, atl. 16 (1860); a very good plate (uncoloured), showing well the habit of the plant.

T. GLANDULOSUM Bertol. l. c. (coloured); drawn from the dried plant, with one of another species on the same plate.

Postscript on the Telephium of Dioscorides.—The Byzantine script of Dioscorides' *Materia Medica*, now known as the *Codex Vindobonensis*, was undertaken and produced under the auspices and at the expense of a noble lady of Constantinople, Anicia Juliana, about the year 512, and is remarkable for the drawings, by an artist of the period, to illustrate the text. The figure opposite the text of *Telephium* is on folio 336, and I find that it exactly agrees with Reichenbach's plate of *Cerithe major* (Ic. Bot. Crit. iv. t. 739), which indeed also is in accord with the Greek text; and I have no doubt that this species is the true *Telephium* of Dioscorides. The resemblance between the ancient and modern figures respectively is most remarkable. With the help of a lens three names may be made out on different parts of the plate, not only in different handwritings, but of different periods,—one in Byzantine Greek of the fifth century, one in the western dialect of Armenian, and the third in mediæval Turkish before it was much differentiated from Persian. I have to acknowledge the assistance of Sir George Watt in deciphering these names. In the Sydenham Society's translation of Paulus Aegineta's treatise on the therapeutical uses of drugs, the editor comes near the mark by referring the *Telephium* of Dioscorides to *Cerithe minor* (in section 3 of the seventh book).

THE FLORA OF CYPRUS.

BY HAROLD STUART THOMPSON, F.L.S.

(Continued from p. 278.)

LINACEÆ.

Linum gallicum L. Cyprus, Kotschy.

L. strictum L. Cypress wood under Buffavento, Kotschy.

L. Sibthorpiatum Reuter. Near Limasol, Colossi, and Famagusta, Kotschy.

L. hirsutum L. Cyprus, Sibth.

L. usitatissimum L. Cultivated on the plain of Morphu, Gaudry; Cyprus, Samson!

L. angustifolium Huds. Near Prodromo, Kotschy (725!).

OXALIDACEÆ.

Oxalis cernua Thunb. Cyprus, Samson!, Lascelles!

GERANIACEÆ.

Geranium molle L. Cyprus, Kotschy (149, 421, 690).

G. rotundifolium L. Near Prodromo, abundantly, Kotschy (933).

G. dissectum L. Cape Greece (150); foot of Castle Regina, Kotschy (420).

G. lucidum L. Cyprus, *Sintenis*; Hilarion, *Lascelles*!

Erodium cicutarium L'Hérit. Rocks on Prodromo, Kotschy (932); Cyprus (Court Garden), *Lascelles*!

E. hirtum Willd. By Episkopi, Kotschy (642).

ZYGOPHYLLÆ.

Tribulus terrestris L. Erucon, *Post*.

RUTACEÆ.

Peganum harmala L. Between Famagusta and Synkrasi; near Paphos, Kotschy; roadsides, *Lascelles*!

SAPINDACEÆ.

Acer creticum L. Troodos, *Post*.

TEREBINTHACEÆ.

Rhus Coriaria L. Mountains of Cyprus, Kotschy & *Post*; mountains near Galata, *Sintenis* (17!).

LEGUMINOSÆ.

Anagyris foetida L. Abundant between Limasol and Omodos, *Sibth.*, 1787; near Kloster Chrysoroodissa, Panteleimon, Kotschy (696!). By the river near Riatiko Cerignia, *Sintenis* (669!).

Calycotome villosa Vahl. Kyrenia Pass, *Lascelles*!

Genista sphacelata Decaisne. At the foot of mountains, *Post*; Kyrenia Hills, *Lascelles*!

Ononis Natrix L. Cyprus, *Sibth.* (*O. crispa* L); above Dikoma, *Lascelles*!

O. pubescens L. Limasol, *Post*.

O. Cherleri L. Melandrina Monastery, on the north coast, near Cerinia, Kotschy (529).

Trigonella hamosa L. Cyprus, *Sibth.*

Medicago tuberculata Willd. Fields near Kythræa, *Sintenis* (636!). Cyprus, garden weed, *Lascelles*! — Var. *spinosa*. Near Kantara, *Sintenis* (474!).

M. sativa L. Platris, *Lascelles*!

M. littoralis Rhode. Fields by the sea near Mavrospilios! Pentadactylon (992!). Near Lefkonicus (482!). Cape St. Andre, *Sintenis* (481!). The var. *subinermis* only is given in Boiss. on Kotschy's authority.

M. lupulina L. Cyprus, *Sibth.*

M. denticulata Willd. Near Larnaka (161); in a cypress wood near Chrysostomo (401); near Prodromo, Kotschy (843!).

M. coronata Lam. Near Chrysostomo (446); Kithera, Kotschy; hill near Kantara, *Sintenis* (477!).

M. minima Lam. Limasol (8984); Cape Gatto, near St. Nicolas, Kotschy; hill near Kythræa, *Sintenis* (476!).

M. tribuloides Desr. Hill near Kythræa, *Sintenis et Rigo* (480!).

M. disciformis DC. Cape St. Andre, *Sintenis et Rigo* (472 !). This is called var. *apiculata* in Boiss. Suppl.

Melilotus parviflora Desf. Near Chrysostomo, *Kotschy* (457).

Trifolium arvense L. Cyprus, *Sibth.*

T. lappaceum L. Cyprus, *Sibth.*

T. angustifolium L. Famagusta, *Lascelles* ! Boissier says Kotschy's no. 303, from near Lanarka, is *T. Pamphylicum* Boiss. et Heldr.

T. dicroanthum Boiss. Near Lapethus, *Kotschy* (481).

T. striatum L. Near Larnaka, *Kotschy* (77 !).

T. globosum L. Near Aeckern, *Sibth.*

T. tomentosum L. Near Limasol, *Kotschy* (1005); mountain near Kantara, *Sintenis* (411 !). Gardens at Nicosia, *Lascelles* !

T. spumosum L. Cyprus, *Sibth.*; near monastery of Kantara, *Sintenis* !

T. nigrescens Viv. Hill near Kantara, *Sintenis* (410 !).

T. speciosum Willd. Cyprus, *Sibth.*

T. repens L. Cyprus, *Sibth.*

T. agrarium L. Near Larnaka, *Kotschy*; garden, *Lascelles* !

Physanthyllis tetraphylla L. Nicosia, *Post*; Papho, *Lascelles* !

Lotus corniculatus var. *alpinus* Boiss. Troodos, *Post*.

L. peregrinus L. Rocks of Cape Greece, *Kotschy* (129).

L. ornithopodioides L. Cyprus, *Sibth.*

Tetragonolobus palæstinus Boiss. Cyprus, *Sibth.*; near Nicosia (488), and near Limasol, *Kotschy*; northern hills, common, *Lascelles* !

Scorpiurus subvillosa L. Hill near Kythraea, *Sintenis* (423 !); plains, *Post*.

S. sulcata L. Near Mazoto, *Kotschy* (550 a).

Coronilla scorpioides L. Cyprus, *Sibth.*; plains, *Post*.

C. varia L. Cyprus, *Sibth.*

Hippocrepis biflora Spreng. Pentadactylon, *Lascelles* !

H. unisiliqua L. Cape Greece, *Kotschy* (164).

Psoralea bituminosa L. Ruins of St. Hilarion, *Sintenis* (670).

Astragalus Spruneri Boiss. Between Larnaka and Nicosia, *Post*.

A. stella L. Cyprus, *Sibth.*

A. sesameus L. Near Larnaka, *Kotschy*.

A. contortuplicatus L. Cyprus, *Sibth.*

A. hamosus L. Near Larnaka, *Kotschy* (31).

A. angustifolius Lam. Near Prodromo and summit of Troodos, *Kotschy* (781).

A. incanus L. Cyprus, *Sibth.*

Hedysarum atomarium L. Foot of Kyrenia Mountains, *Post*.

Onobrychis Gaertneriana Boiss. Pentadactylon, *Lascelles* !

O. saxatilis All. On the mountains above Lapethus, *Sibth.*

Alhagi maurorum DC. Clayey soil north of Famagusta, *Gaudry*; plains, *Post*.

Cicer arietinum L. Near Episcopi and Wretscha, *Kotschy*; Cyprus, *Samson* !

Vicia sepium L. Cyprus, *Sibth.*

- V. seriocarpa* Fenz. var. *microphylla* Boiss. Cyprus, Samson !
V. sativa L. Cyprus, Kotschy & Samson !
V. lathyroides L. Cyprus, Sibth.
V. narbonensis L. Cyprus, Sibth.
V. dumetorum L. Hills above Omodos, Kotschy.
V. onobrychioides L. Cyprus, Sibth.
V. Cracca L. Cyprus, Sibth.
Ervum Lens L. Cyprus, Kotschy.
E. Ervilia L. Plains between Famagusta and Synkrasi, Kotschy (545).
E. pubescens DC. Cypress wood near Chrysostomo, Kotschy (399).
Lathyrus Cicera L. Fields near Lefkonicus, Sintenis et Rigo !
 Fields near Larnaka, Kotschy (154 !); plains, Post.
L. Aphaca L. Cyprus, Samson !
L. sphæricus Retz. Fields, Lascelles !
Pisum arvense L. Fields near Kythræa, Sintenis et Rigo (991 !).
P. elatius M. B. Cyprus, Lascelles !
P. humile Boiss. & Noë. Nicosia, Post.
P. fulvum Sibth. & Sm. Near Kythræa, Sintenis et Rigo (453 !).

ROSACEÆ.

- Cerasus avium* Moench. Near Maschera Monastery (Prodromo), Kotschy.
Pyrus Aria Crantz. var. *græca* Boiss. Summit of Troodos, Kotschy (766 and 779); Troodos, Post.
Mespilus germanica L. Prodromo, Kotschy (893); Machæra-Lefkara, Post.
Cratægus monogyna Jacq. South side of Prodromo, Kotschy (720).
Cotoneaster nummularia F. & M. Summit of Troodos, Kotschy (779); also Post & Lascelles !
Rosa centifolia L. Lapethus and Cerinia, Kotschy.
Rubus discolor Nees. "Everywhere," Post. Kotschy gives several localities for this under the name *R. sanctus* Schreb.
R. candicans Weihe. On the way from Evricus to Solia, Kotschy (917).
Potentilla hirta L. Above Prodromo, Kotschy (816).
Poterium verrucosum Ehrenb. Between Panteleimon and Paleo Milo, Kotschy (940); Ktima, Post.
P. spinosum L. Küstenorten, Kotschy.

LYTHRACEÆ.

- Lythrum Hyssopifolia* L. Euriku, Sintenis (690 !). Troodos, Post.

CUCURBITACEÆ.

- Citrullus Colocynthis* L. Near Nicosia, Gaudry; near Athalassa, Lascelles !
Bryonia dioica Jacq. Cape Greece, Kotschy (116).
Momordica (Ecballium) Elaterium L. Near Larnaka, Kotschy (111).

CRASSULACEÆ.

Umbilicus Pestalozzæ Boiss. St. Hilarion, *Post*.

U. globulariæfolius Fenzl. Near the Castle Regina, between Lapethus and Prodromo, *Kotschy* (488).

U. pendulinus DC. Near Pentadactylon, rocks of the Castle Regina near Lapethus, *Kotschy*.

Sedum altissimum Poir. Near Prodromo, *Kotschy* (816 a).

S. palestinum Boiss. Pentadactylon, *Lascelles*!

ONAGRACEÆ.

Epilobium hirsutum L. Troodos, *Post*.

UMBELLIFERÆ.

Eryngium creticum Lam. Plains of Cyprus, *Post*; Limasol, *Kotschy*.

E. campestre L. On the way from Kuklia to Hierokipos, *Kotschy*.

E. maritimum L. Near Paphos, *Sibth*.

Bupleurum rotundifolium L. Cyprus, *Sibth*.

B. semicompositum L. Between Ktima and Chrysoku, *Sibth*.; near Larnaka, *Kotschy* (317).

Pimpinella Tragium Vill. St. Hilarion, *Post*.

Scaligera cretica Boiss. Panteleimon Monastery, near Paleo Milo, *Kotschy* (935).

Ammi majus L. Rich cultivated land near Larnaka, *Kotschy*.

Anthriscus vulgaris Pers. Cyprus, *Sibth*.; near Prodromo and Galata, *Kotschy*.

Scandix Pecten Veneris L. Near Larnaka, *Kotschy* (24 a).

Conium maculatum L. Abundant near the Chrysoroodissa Monastery, *Kotschy* (695).

Physospermum aquilegifolium Koch. Near Paleo Milo, around the monastery of Panteleimon, *Kotschy* (935).

Smyrnum connatum Boiss. & *Kotschy*. In the ruins of the Castle Regina at Buffavento, *Kotschy* (344).

Echinophora Sibthorpiana Guss. Nicosia, *Post*.

Ferula communis DC. Abundant on conglomerate near Larnaka, *Kotschy*.

**F. cypria* *Post*. Castle of St. Hilarion, *Post*.

Peucedanum veneris *Kotschy*. Near Paphos, *Kotschy* (632).

Siler cordifolium Boiss. In the vineyards of Perapidi, *Post*.

Anethum graveolens L. Near Limasol, *Kotschy*.

Tordylium syriacum L. Near Larnaka, towards Livadia, *Kotschy* (256 a).

Orlaya platycarpa Koch. Near Prodromo, *Kotschy* (900).

O. maritima Koch. Scattered about in the sand from Ktima to Paphos (664 a); on sand-dunes around Limasol near Amathus, *Kotschy* (574).

Daucus Broteri Jen. Plains and mountains of Cyprus, *Post*.

D. muricatus L. var. *littoralis* *Sibth*. Sea-coast of Cyprus, *Sibth*.

D. Carota L. Prodomo, *Gaudry*.

Caucalis daucoides L. About Prodomo, *Kotschy* (807).

C. leptophylla L. Cyprus, everywhere, *Post*; Cape Greece, *Kotschy* (128, 407).

C. tenella Del. Near Larnaka, *Kotschy* (83).

Turgenia latifolia L. Corn-fields between Slewra and Chrysoroodisa, *Kotschy*!

ARALIACEÆ.

Hedera Helix L. Near the Trooditissa Monastery and Tillanus, *Kotschy*.

CAPRIFOLIACEÆ.

Sambucus nigra L. Mountain villages and Larnaka, *Kotschy*.

RUBIACEÆ.

Rubia tinctorum L. Near Morphu and Perilimno, *Kotschy*.

Sherardia arvensis L. Chrysostomo, *Kotschy* (983).

Asperula stricta Boiss. Buffavento, *Post*.

Galium canum Req. Rocks on Cape Greece (160, 363); rocks on Pentadactylon (359); above Chrysostomo (408); near Cerinia, *Kotschy* (465).—Var. *musciforme* Boiss. St. Hilarion, *Post*.

G. saccharatum All. Plentifully on Cape Greece (139 a); near Prodomo, *Kotschy* (849).

G. tricornis With. Neighbourhood of the Maschera Monastery, *Kotschy* (234).

G. murale DC. Near Prodomo, *Kotschy* (715).

G. Aparine L. β *macrocarpum* Boiss. Occasionally near Larnaka, *Kotschy* (36).

G. setaceum Lam. In cypress wood near Chrysostomo, *Kotschy* (449).

Vaillantia hispida L. Cape Greece, *Kotschy*.

VALERIANEÆ.

Valeriana sisymbriifolia Desf. Cyprus, *Lascelles*!

Valerianella chlorodonta Coss. & Dur. Cyprus, *Lascelles*!

V. eriocarpa Desv. Near the Monastery of Chrysostomo, *Kotschy* (436).

DIPSACEÆ.

Scabiosa crenata Cyrill. Near Sta. Croce, *Sibth*.

S. ukranica L. Cyprus, *Sibth*.; Chrysostomo, *Kotschy*.

**S. cyprica* *Post*. Near Perapedia, *Post*.

Pterocephalus plumosus Coult. Near Chrysostomo (409); near Paphos, *Kotschy* (660).

P. palæstinus Coult. Fields near Cerinia, *Sibth*.

(To be continued.)

"BOTANY IN ENGLAND."

BY THE EDITOR.

PROFESSOR F. W. OLIVER'S Presidential Address to the Botanical Section of the British Association consisted of two parts, one dealing with "The Seed, a Chapter in Evolution," the other with "Botany in England." With the former we do not propose to deal; but the latter raises so many points for discussion that we cannot but wonder that Prof. Oliver selected for its delivery an opportunity when discussion was impossible. Although headed "Botany in England," it is mainly occupied with an attack upon the two great public herbaria—which, in Prof. Oliver's opinion, "stand apart from the ordinary botanical current," and must consequently "languish" or "suffer atrophy through disuse."

Prof. Oliver's style is not easy to follow, and we sometimes find it difficult to grasp his meaning. We propose, however, to offer a few remarks upon some of his statements, premising that we do not admit his claim to act as a judge in matters with which it is abundantly evident he is but imperfectly acquainted.

Having given a very brief sketch of what he considers "the prevailing school of botany," Prof. Oliver proceeds to inform us that it "has arisen very independently of that which preceded it." Here we must at once join issue with him. He continues:—"All through the middle parts of the last century we were so busy amassing and classifying plants that the great questions of botanical policy were left to solve themselves." Yet this period included the morphological work of Robert Brown, Lindley, and Sir Joseph Hooker; not to mention that of Carruthers and W. C. Williamson, who were largely instrumental in establishing the science of palæo-botany, and without whose work the first part of Prof. Oliver's address would hardly have been written. In view of the above references, can it be said with any degree of accuracy that "the prevailing school of botany has arisen very independently of that which preceded it"?

Prof. Oliver continues:—"Great herbaria became of the order of things; they received Government recognition, and they continue their work apart. Those who built up these great collections neglected to convince the schools of the importance of training a generation of botanists that would use them. The schools were free, and they have gone their own way, and that way does not lie in the direction of the systematic botany of the herbarium. So long as this tendency prevails, the herbaria must languish. When I say languish, I do not mean that they will suffer from inefficient administration—their efficiency probably has never been greater than at the present time. But the effort involved in their construction and upkeep is altogether disproportionate to any service to which they are put. . . . If things are left to take their course there is the fear of atrophy through disuse."

It is not easy to understand what Prof. Oliver means in the first

portion of this paragraph. The main function of "the schools," as it appears to us, is not to train a generation of botanists to use herbaria, but to impart a general knowledge of the subject which will enable the student to follow up any line which may have a special attraction for him, including of course systematic botany. But the flourishing existence of herbaria depends very little upon "the schools." The students of botany both at the British Museum and Kew are sufficiently numerous to show that Prof. Oliver's fear of "atrophy through disuse" is groundless, although, according to him these herbaria "stand apart from the ordinary botanical current." Whatever may have been "the effort involved in their construction," it is a thing of the past, and its proportion or disproportion to the "service to which they are put" cannot be discussed: their "efficiency," he admits, was "never greater than at present." It may be that besides the "ordinary botanical current" with which Prof. Oliver is acquainted, there is another of whose course he is ignorant.

Having, however, satisfied himself that the "general position of systematic botany" requires "alleviation," and that atrophy is imminent, the Professor proceeds to "attempt an analysis of some of the causes which have led to this condition of affairs." Neither the British Museum nor Kew "has any connection, direct or indirect, with any university organization; there are no facilities for teaching; there are no students; no machinery exists for training recruits or for interesting anybody in the ideals and methods of systematic botany." If by this Prof. Oliver means that herbaria are not teaching bodies in the sense that a university is, he is accurate enough; but when he proceeds to argue as a consequence that there are no means for interesting folk in systematic botany, he evidently speaks in ignorance of what can be and is being done. As regards the National Herbarium, of which we are in a position to speak, it would not be difficult to find systematists of European reputation who would acknowledge with gratitude the help they have received in acquiring a knowledge of "the ideals and methods of systematic botany"; and we have no doubt that similar testimony could be given at Kew. To take one example from each:—Mrs. Gepp, who has a world-wide reputation as an algologist, owes her position to the "ideals and methods" acquired as a student in the Department of Botany; Mr. Hiern, whose monograph of *Ebenaceæ* (1873) was but the first of a long series of contributions to systematic botany, first became "interested" at Kew, and has since, at both herbaria, availed himself of the "facilities"—for learning if not for teaching—which they afford.

Prof. Oliver then goes on to suggest "another way in which a great economy could be effected in effort, time, and money; this is the transfer of the collections and staff of the Botanical Department from the Museum to Kew. This is a very old proposal, first seriously entertained some fifty years ago after the death of Robert Brown." It may be remarked *en passant* that this "old proposal" was first made in the course of Brown's own evidence before the Royal Commission on the British Museum in 1848, and rebutted by

him (Q. 3468-9). "There must," he continues, "be endless files of reports and Blue Books in official pigeon-holes dealing with this question." This, of course, is pure hypothesis. "The most recent report of a departmental committee is known to all interested in the matter. From the character of the evidence tendered it is not surprising that no action has been taken." Prof. Oliver must know that the "evidence" was tendered by men of qualifications at least equal to his own—men, moreover, acquainted, as he manifestly is not, with the work and functions of a herbarium; and that if "no action was taken" it was because none seemed desirable. This, however, does not prevent an *ipse dixit* which at any rate shows that the Professor will allow no undue modesty to hinder the expression of his opinion: "I am at a loss to find any adequate reason for the maintenance of two separate herbaria." We have no intention of entering upon a discussion of the matter; suffice it to say that those best acquainted with both collections have long been of the contrary opinion, and that that opinion is strengthened as their knowledge increases. We note that in contemplating the fusion, Prof. Oliver assumes that this would be done by the transfer of the Museum collections to Kew; but his acquaintance with the report of the departmental committee to which reference has been made will have shown him that the reverse process has been advocated, and in view of his hope for an alliance of the herbarium officials with a "local university," it would seem a more reasonable plan.

It is clear from the whole tenour of his remarks that Prof. Oliver is unacquainted with the functions or the value of public herbaria, and it is only when we recognize this that his position becomes intelligible. His ignorance is the more remarkable considering the eminent position as a systematic botanist attained by his father when keeper of the Kew Herbarium; but it is obvious when, for example, he tells us that "in the long run it may be that our present collections will prove obsolete," and adds significantly, "the scrap-heap is the sign and measure of all progress." He does not understand that a public herbarium fulfils a variety of purposes with which the "schools" have, and can have, nothing to do. At the National Herbarium, for example, the botanical history of the last two or three hundred years can be traced; the types of Linnean species, of the early American collectors, and the great Sloane Herbarium are therein preserved; and so far from showing any signs of becoming "obsolete," they are constantly consulted by botanists from all parts of the world, both by personal visits and by correspondence. Apart from these, the student of the British flora, the amateur botanist, the horticulturist, the elementary teacher, and the intelligent inquirer find the Herbarium a convenient centre for prosecuting their studies, and for obtaining information which they could not readily obtain elsewhere. If Prof. Oliver's ideal were realized, botany would become the sole possession of the schools; and not only the foreign systematist, but the general public, the private student, the amateur, and the monographer would be excluded from consideration. The National Herbarium

and that at Kew are supported by public funds ; it is therefore manifestly but common justice that the public, rather than the schools, should have the prior claim to their services.

The fact is that Prof. Oliver looks at botany exclusively from his own somewhat narrow standpoint—that of a successful and capable teacher obsessed by the notion that teaching is the only thing worth troubling about. For this purpose there must be an alliance between the authorities of the herbaria and the “local university” ; for “directly you give the keepers or assistants in the former a status in the latter, you place at the disposal of the systematists a considerable supply of recruits in the form of advanced students possessing the requisite training to carry out investigations under direction.” But where are these students to find employment ? If the fusion of the two herbaria to which he looks forward would effect “a great economy in effort, time, and money,” it would seem that the openings for trained students would have to be reduced rather than increased.

Prof. Oliver has not adduced convincing evidence of the organizing capacity of “the local university,” or of the desirability of entrusting to it, or to “the schools,” the sole management of botanical affairs. The London University, for example, has recently been severely criticized in the daily press for the mismanagement and neglect of the valuable libraries entrusted to its charge. The *Tribune* of Aug. 16 says :—

“The University, when it migrated from Burlington Gardens to its present quarters, had two magnificent collections of books—the ‘Grote’ and the ‘De Morgan,’ besides a considerable accumulation gathered at various times. When the removal took place the books were conveyed in trolleys by workmen, ‘dumped down’ anywhere, and allowed to remain in the utmost confusion exposed to great risk and damage. Rare editions were actually found later on at the bottom of the lift-hold in a pool of water. Books lay about in rooms where committees sat ; anyone who took a fancy to a volume carried it off, entering his name, and the name of the author, if he were very scrupulous, in a little washing-book. A porter was librarian, and the lift-boy sub-librarian. At one time it was proposed to make a subject-catalogue, and a former official of the university began to carry out the scheme on slips of paper, as he rode to and from his work on the omnibus. His notes have been preserved as a curiosity. He catalogued a famous antiquarian work on ‘Seals’ under ‘Zoology.’ ”

May it not be asked whether the universities or “the schools” have done more for the advancement of “botany in England” than men like Robert Brown and Sir Joseph Hooker, whose work was unconnected with either ? Is it not the case that at the present time botany in our oldest university finds its most active exponent in the person of an amateur systematist ?

One lesson which may be gathered from Prof. Oliver’s onslaught is the extreme importance of retaining the National Herbarium under the management of trustees. One shudders to think what would happen were it handed over to the tender mercies of men

of his stamp, or to some purely bureaucratic body. This danger was pointed out by the *Westminster Gazette* in its account of the British Association meeting :—

“It is interesting to note the dangers to a scientific institution directly under our bureaucracy when Professor Oliver, in his address this morning to the Botanical Section, actually urges that the British Museum botanical collections should be transferred from the enlightened charge of the independent trustees to Kew, which is under the Board of Works. If Government is to advance the pursuit of scientific research by subsidies, it must be content to entrust the disposal of these subsidies to boards of independent men.”

It seems to us that, of course unconsciously, he has supplied a weighty argument in favour of retaining the two herbaria, so that if at one the “dead Welwitschia” should be ousted by the “live dandelion,” the former may yet be retained in safe custody for the benefit of future students.

Much more might be said did space allow. It would be possible, for instance, to show more fully what has already been indicated—namely, that Prof. Oliver is hardly qualified, either by knowledge or position, to pronounce judgement upon matters as to which older if not wiser men have expressed very different opinions. We think that, on reflection, he will regret that he introduced what was felt by many who heard it to be an element of discord into an assembly of botanists from all parts of the country. “He is evidently,” as Bentham said of Naegeli, “a man of great ability and zeal, and a constant and hard worker”; and we can only hope that increasing years will enable him to take broader views, and at least to recognize that his individual standpoint is not the only one, and need not necessarily be the best.

A NEW INDIGOFERA FROM TROPICAL AFRICA.

By EDMUND G. BAKER, F.L.S.

Indigofera circinella, sp. nov. Suffrutex. Caules ramosi superne angulati plus minus albo-strigillosi ex speciminibus mihi obviis 12–16 cm. longi. Folia imparipinnata pallide viridia 1–3-juga cum impari subsessili vel petiolulato, foliolis oblanceolatis vel oblongo-oblanceolatis inferne albo-strigillosis ad summum 8·0 mm. longis lateralibus alternis. Stipulae lineari-lanceolatae. Flores tenuiter pedicellati, pedicellis fructiferis deorsum arcuatis. Calycis tubus brevis extus albo-strigosus, laciniae quam tubus longiores anguste lanceolatae. Corolla in speciminibus mihi obviis deest. Ovarium lanceolato-lineare albo-strigillosum. Stylus incurvus. Stigma parvum terminale capitellatum. Legumen circinnatim tortum subtorulosum plurispermum extus albo-strigillosum apice mucronatum subcylindricum ad suturas subincrassatum.

Species *I. alternanti* DC. affinis.

Hab. BRITISH EAST AFRICA: Mau, alt. 7000 ft.; *G. F. Scott Elliot*, Ruwenzori Expedition, no. 6892! (Herb. Mus. Brit.)

This plant would be best placed in Harvey's group *Alternifoliæ*, which, as far as I am aware, has not hitherto been used for any of the species occurring in Tropical Africa. The circinnately twisted, subcylindrical, subtorulose pods are a noticeable feature of this species.

The following additional localities have been noted since the publication of my paper in this Journal for 1903:—

Indigofera brevicalyx Baker fil., Journ. Bot. 1903, 237. Lake Marsabit, *Lord Delamere*! 1898.

I. longemucronata Baker fil. *l. c.* p. 330. North of Mombassa to Lamu and Witu, *Alex Whyte*! 1902.

I. aspera Perr. in DC. Prod. ii. p. 229 (1825). Amboland, Ondonga, *Rautanen*, no. 446! With narrower leaflets than type.

The following species have been described:—

I. ERYTHROGRAMMOIDES De Wildeman, Ann. Mus. Congo Bot. v. p. 133 (1904). (*Simplicifoliæ*.)

Hab. Congo: region of Lula-Lumene, *P. Hendrickx*.

I. RUSPOLI Baker fil. in Mitt. Bot. Mus. Zurich, xxii. p. 192 (1904). (*Trifoliolatae*.)

Hab. Somaliland: Warandab, *C. Keller*!

I. MOEROENSIS De Wild. *l. c.* (*Stenophyllæ*.)

Hab. Congo: Lac. Moero, *Verdick*.

I. VARIABILIS De Wild. *l. c.* (*Stenophyllæ*.)

Hab. Congo: Kisantu, *J. Gillet*, no. 734.

This must not be confused with the *I. variabilis* N. E. Brown from Ngamiland, published in Journ. Bot. 1903, p. 192. The second *I. variabilis* is only known to me from Dr. De Wildeman's description.

I. KELLERI Baker fil., *l. c.* (*Pinnatæ*.)

Hab. Somaliland: Abdallah, *C. Keller*, 1891.

Allied to *I. pseudosubulata* Baker fil., from Niam-Niamland.

I. WENTZELIANA Harms in Bot. Jahrb. xxx. p. 326 (1901). (*Pinnatæ*.)

Hab. German East Africa: Ussangu, *Goetze*, no. 1268.

This was overlooked when I published my paper.

I. BUTAYEI De Wild., *l. c.* p. 132. (*Tinctoriæ*.)

Hab. Congo: N. Lemfu, *R. P. Butaye*, and Kisantu, *J. Gillet*, n. 960.

I. BAGSHAWEI Baker fil. in Journ. Linn. Soc. xxxvii. p. 142 (1905). (*Tinctoriæ*.)

Hab. Central African lake region: Musozi, *Dr. Bagshawe*, no. 11!

Allied to *I. heterocarpa* Welw.

I. RAUTANENI Baker fil. in Mitt. Bot. Mus. Zurich, xxii. p. 189. (*Amecarpus*.)

Hab. German South-West Africa: Hereroland, Ojikango, *Rautanen*, no. 464! Herb. Mus. Brit.; herb. Schinz. Quaiputs, *Dinter*, no. 187! herb. Schinz.

Non satis notæ.—*I. oligantha* Harms and *I. sangana* Harms, in Schlechter, West Afr. Kaut. Exp. p. 291, names only.

WATSON EXCHANGE CLUB REPORT, 1904-5.

[THE following notes are extracted from the Report of the Watson Botanical Exchange Club for 1904-5, and should have appeared earlier. Mr. William Bell was distributor for the year; the Secretary of the Club is now Mr. George Goode, De Freville Avenue, Cambridge. For notes on *Rubus*, *Hieracium*, and *Euphrasia*, reference must be made to the Report.—ED. JOURN. BOT.]

CARDAMINE AMARA L. var. ERUBESCENS Petermann. This plant was found on May 15th, 1905, growing in abundance between Black Boy Wharf and New Head Bridge, on the canal, Addlestone, North-west Surrey. It differs chiefly from the type in its small flowers, the petals of which are distinctly tipped with pink, so that it is probably the same as the var. *Opizii* Presl. forma *lilacina* Beck (*Fl. Nieder-Osterr.* 453). Otto E. Schulz, the author of the monograph of the genus *Cardamine* in *Engl. Jahrb.* xxxii. 501 (1903), who has seen a specimen, calls it "*C. amara* L. var. *erubescens* Petermann, or more exactly *C. amara* L. var. *subglabra* Schur, subvar. *erubescens* Petermann," and he thinks it the first British record, though there is said to be a very similar plant in Herb. Brit. Mus. from Lodsworth, Sussex (Rev. E. S. Marshall), named *C. amara*, the flowers of which, however, are less coloured than in the Surrey plant. In *Bot. Exch. Club Report* for 1888, p. 200, Mr. Druce has a note on a pink-flowered form of *C. amara* from Heyford, Oxon, and in his *Flora of Oxfordshire*, p. 28, is noted a hybrid *C. amara* × *pratensis* growing at the same place, "the flowers darker in colour than *pratensis*, having more of a purplish tint, but slightly smaller than *amara*; the anthers violet, as in *amara*, but the style nearer that of *pratensis*. There appears to be no reference to this hybrid in the European Floras." Miss Katherine Fitzgerald, who discovered the plant in Surrey, and submitted specimens to Kew, says that "the plant nearest the water is quite white, the pale lilac being found some feet from the water and in less abundance."

ROSA TOMENTOSA Sm. var. PSEUDO-MOLLIS E. G. Baker. Cowleigh Park, Herefordshire, v.-c. 36, July 4th and August 9th, 1904.—S. H. BICKHAM. I do not know *pseudo-mollis*, but this plant does not remind me of *mollis*. The leaves are perhaps more hairy than usual, but not more so than in many of my specimens of *tomentosa*, which species also frequently has equally persistent sepals. Possibly

much of our so-called *tomentosa* would be better placed under *mollis*.—A. H. WOLLEY-DOD. “I do not remember where or when Mr. E. G. Baker’s *pseudo-mollis* was described; and it is not given in Groves’ *Babington* (*Man.* ed. 9). But you will find there under *R. tomentosa* a var. *cuspidatoides* Crépin described, with which your rose seems to agree precisely. Still I have not specimens of either variety. Crépin did not allow the Yorks specimens (which I have) of var. *cuspidatoides*.”—E. F. LINTON. [The description is in *Journ. Bot.* 1892, 341.—ED. JOURN. BOT.]

R. CANINA L. var. *ARVATICA* Baker. Bullen Bank, Ledbury, Herefordshire, July 6th, 1904.—S. H. BICKHAM. This may be rightly named, but I am not clear as to what Baker means by his *arvatica*. He says “non Puget,” but Déséglise, in his *Cat. Raisonné*, p. 269 (1877), makes Baker’s and Puget’s plants synonymous, and classifies them in his sub-section *Pseudo-rubiginosa*, which have glands all over the under surface of the leaflets, such as this plant certainly has not. It matches very closely a Cheshire plant, named *R. cæsia* Sm. for me last year by Mr. Rogers and Mr. Ley, except that in the latter the leaflets are more rhomboidal. The paucity of prickles on the flowering-branches, large doubly dentate leaflets very hairy beneath, very glandular petioles and short naked peduncles are the same, but *R. cæsia* should have glandular peduncles and sepals glandular on the back. Perhaps both plants should go under *R. canescens* Baker = *R. canina* var. *incana* Baker, and I should provisionally label them as such.—A. H. WOLLEY-DOD. “I agree to *R. arvatica*, about which I should say there could be no doubt.”—E. F. L.

R. ARVENSIS × *SYSTYLA*. Hedge, Brace’s Leigh, near Malvern, Worcestershire, v.-c. 37, June 30th, 1904, and October 22nd, 1903.—S. H. BICKHAM and R. F. TOWNDROW. I should say *R. systyla* Bast. I see no evidence of *arvensis*. The shape, size, and spacing of the leaflets, and their being more or less hairy beneath, also the pinnate sepals, short thick style column, shape of fruit, and—as far as I can judge—colour of petals, all point to *systyla*.—A. H. WOLLEY-DOD. This rose has much of the appearance of a *R. systyla* form, and the specimens show little sign of any divergence. But the reported habit of the plant, and its tendency to sterility, coupled with the rather long peduncles, are fair evidence of the suggested *R. arvensis* parentage, and the subglabrous leaves fall in with this theory. *R. arvensis* often has ovoid fruit.—E. F. L.

MATRICARIA DISCOIDEA DC. Waste ground round Falmouth, West Cornwall, v.-c. 1, September 29th, 1904.—S. H. BICKHAM. See F. H. Davey’s tentative *Flora of Cornwall*. This alien is fast becoming a common weed near railways, docks, and mills all over the kingdom.—W. B.

SENECIO VULGARIS L. var. *RADIATUS* Koch. Portishead Station-yard, North Somerset, v.-c. 6, May 30th, 1904.—J. W. WHITE. The variety seems to occur usually in the neighbourhood of the sea; also at Killarney, where there are large sheets of water.—E. F. L.

ERYTHRÆA ——. Exposed downs, Newquay, West Cornwall, v.-c. 1, October 3rd, 1904. — S. H. BICKHAM. (1) *E. pulchella*. (2) *E. sphærocephala*. (3) Two plants look so intermediate, I don't know where to place them, unless (?) hybrids between the two. — E. F. L. New county record for *E. sphærocephala*.

GLYCERIA PLICATA Fr. var. DECLINATA (Bréb.). Blackwaterfoot, Arran, v.-c. 100, August 13th, 1904. Stagnant marshy spots in pasture fields close to sea. — A. SOMERVILLE. This is luxuriant *G. declinata* (Bréb.); which, from a good many years' experience, I consider to be a distinct species. — E. S. MARSHALL.

G. FESTUCÆFORMIS Heyn. Among wet rocks just below tide-mark, with *G. maritima*, Portaferry, co. Down, July, 1904. — C. H. WADDELL. I am not sure if all the smaller plants in this gathering are correctly named, as the line which separates small *festucæformis* from large *maritima* does not seem to me to be well defined. I have sent all—large and small—without selecting, as they were gathered. — C. H. W. The tall specimen on the sheet submitted is *Glyceria festucæformis* Heynhold; the rest is all *G. maritima* Wahl. E. F. L.

TRICHOMANES RADICANS Sw. Merionethshire, v.-c. 48, August, 1904. — A. J. CROSFIELD.

EQUISETUM HYEMALE L. Sandy field, Weston-super-Mare, North Somerset, v.-c. 6, September 17th, 1904. — H. W. PUGSLEY. Reported in the *Fl. Bath Suppl.* by Dr. Davis as occurring "on the canal-bank" near Bath. The Rev. R. P. Murray, in his *Fl. of Somerset*, p. 406, remarks, "Probably a misnomer." This species is a very rare plant in the south. It occurs in plenty in Surrey (Salmon sp.), and I have seen specimens from East Kent. Both this and *E. arenarium* Newman were found by Messrs. Murray and White in 1901, and recorded in the *Exchange Club Report for 1901*. Mr. White remarks, "Probably unknown in the county until observed, as I understand, by Mr. Corder, of Taunton." It is not named as a Weston plant in Dr. St. Brody's *Flora of Weston*, 1856. — A. BENNETT.

BIBLIOGRAPHICAL NOTES.

XXXIX.—THE DATES OF PUBLICATION OF LAMARCK'S 'ENCYCLOPÉDIE MÉTHODIQUE' (BOTANY).

[Messrs. C. Davies Sherborn and B. B. Woodward publish in the *Annals and Magazine of Natural History* for June an article on the dates of publication of the Natural History portions of the *Encyclopédie Méthodique*, from which we extract the portion relating to the volumes on Botany, vols. v.-viii. of which were by Poiret. A note by Mr. Woodward on Dr. Kuntze's allocation of dates is added. — ED. JOURN. BOT.]

Pages.			titlepage dated.	Date of publication.	Livraison in which it appeared.	Source of information.
Tom.	I. pt. 1.	pp. i-xliv, 1-368 ?	1789.	Dec. 1783.	6	Encyclop. Méthod. "Avertissement" prefixed to "Beaux Arts, Tom. I." pp. lxxv-xcv & xcvi.
	2.	369 ?-752.		Aug. 1785.	14	
	II. pt. 1.	1-368 ?	1790.	Oct. 1786.	20	
	2.	369 ?-774.		Apr. 1788.	26	
	III. pt. 1.	v-viii, 1-360.	1789.	1789.	34	Livraisons, in the original wrappers, in the Library of the "Academy of Natural Sciences of Philadelphia."
	2.	361-753.		1791.	48	
	IV. pt. 1.	1-400.	An iv.	[1797].	61	
	2.	401-760 [-764 ?].		[1798 ?].	65	
	V.	i-viii, 1-748.	1804.	1804.	68	
	VI. pt. 1.	1-	1804.			
	2.	-786.				
	VII. pt. 1.	1-	1806.			
	2.	-731.				
	VIII. pt. 1.	1-	1808.			
	2.	-879.				
— "Supplément." By POIRET.						
Tom.	I. pt. 1.	pp. i-xviii, 1-	1810.			
	2.	-761.				
	II. pt. 1.	1-384.	1811.	1811.	76	Bibl. Franç. 29 Nov. 1811, p. 83.
	2.	385-876.		1812.	77	" " 5 July, 1812, p. 481.
	III. pt. 1.	1-368.	1813.	1813.	78	" " 17 Sept. 1813, p. 406.
	2.	369-780.		1814.	80	" " 3 Sept. 1814, p. 241.
	IV. pt. 1.	1-368.	1816.	1816.	83	" " 29 June, 1816, p. 273.
	2.	369-731.		1816.	84	" " 14 Dec. 1816, p. 545.
	V.	i-viii, 1-780.	1817.	1817.	85	" " 1 Nov. 1817, p. 593.
"Illustrations des Genres." By LAMARCK, continued [Tom. II. pt. 2-III. & Suppl.] by POIRET.						
Tom.	I. pt. 1.	pp. 1-232.	N. D.	[1791].	44	{ Verso of title to vol. ii. "Lettre," p. 12 note, prefixed to "Histoire," Tom. V.
	2.	233-496.				
	II. pt. 1.	1-136.	1793.	1797.	60	{ Mag. Encyclop. 1797, Tom. I. p. 270. Copy of part in Botanical Dept. Library, Brit. Mus. Nat. Hist.
	2.	137-551.		1819.	88	
	III. & Suppl.	1-568.	1823.	1823.	92	Bibl. Franç. 6 Nov. 1819, p. 513.
		569-728.				" " 1 Mar. 1823, p. 121.
"Planches," subsequently made up into 4 vols. of 250 plates each.						
	Pls.	1-100.	{ 1823. }	1791.	44	{ "Lettre," p. 12 note, prefixed to "Histoire," Tom. V.
		-700.		1797.	60.	
		[901-950]. 50 pls.		1819.	88	Mag. Encyclop. 1797, Tom. I. p. 270.
		951-1000 (*). 50 pls.		1823.	92	Bibl. Franç. 6 Nov. 1819, p. 513.
						" " 1 Mar. 1823, p. 121.

* The fact that these plates are so often found bound apart from the rest, or, as in the Library of the Linnean Society, with Tom. II. and III. of the "Illustrations," helps to identify these numbers.

Dr. O. Kuntze, in his *Revisio Generum Plantarum*, i. p. cxxxiii, states, on the authority of an unpublished work by De Candolle, which he saw in Geneva, that the first seven hundred plates came out in sixty livraisons, of which the last appeared in 1797. He further points out that Ventenat, in the *Tableau du Règne Végétal*, quotes no plate of the *Encyclopédie* after No. 800, and this work appeared in "An vii," or about 1799.

Dr. Kuntze accordingly makes the following allocation:—

Plates 1–100,	1791.	Plates 401–500,	1795.
„ 100 [<i>sic</i>]–200,	1792.	„ 501–600,	1796.
„ 201–300,	1793.	„ 601–700,	1797.
„ 301–400,	1794.	„ 701–800,	1798.

This conclusion is, however, not quite convincing, since Kuntze is obliged to abandon the division into sixty livraisons and assume an issue of a hundred plates each year.—B. B. W.

SHORT NOTES.

ROSA AGRESTIS Savi (*R. sepium* Thuill.) IN BUCKS.—Some years ago I gathered in the north of the county, near Marsh Gibbon, a rose which had the facies of the above species, but was so exceptionally eglandular that I hesitated to adopt it; but recently I met, while botanizing at Hambledon, a typical plant. Thus now all the three counties of the Upper Thames can claim this species. Here it grew on the chalk with *Rosa dumalis*, *R. micrantha*, *R. tomentella*, and other roses.—G. CLARIDGE DRUCE.

AGROSTIS VERTICILLATA Vill. IN THE CHANNEL ISLANDS.—In July last, while botanizing with Mr. E. D. Marquand, I noticed this grass, hitherto unrecorded for the Channel Islands, growing in great plenty about Vale, and the next day gathered it in Alderney. Details and description will appear in a future number.—G. CLARIDGE DRUCE.

A CORRECTION (p. 281).—Specimens recently obtained, in fruit, of the plant which in my note I referred to *Eleocharis uniglumis*, prove that it was *E. multicaulis*. This is not a new record for Devon.—C. E. LARTER.

NOTICES OF BOOKS.

British Flowering Plants. By W. F. KIRBY, F.L.S., F.E.S. With 120 coloured plates and 119 illustrations in the text. Oblong 8vo, cloth, pp. vi, 215. Price 5s. net. London: Sidney Appleton.

WE have looked in vain in the preface to this volume for any explanation of its origin. That, however, is plain enough. The publisher, having acquired the right to reproduce the plates or a selection of some (probably German) popular book on flowering plants, has induced Mr. W. F. Kirby to provide suitable letter-

press, and has issued the volume under the somewhat misleading title of *British Flowering Plants*. Mr. Kirby has a well-earned reputation as an entomologist, and this gives a value to this little book as a record of the principal insects which feed on the plants described—a record somewhat disproportionate to the ostensible object of the book. Thus the order *Ulmaceæ* occupies 27 lines, 17 of which are devoted to two butterflies which feed on elm; the description of the oak, “of which there are several varieties,” occupies 13 lines: that of the insects associated with it 77! The result is as if a botanist were to write, to foreign plates, a work on British insects, devoting himself in great measure to an account of the plants on which they feed.

The compilation of such a volume is easy enough, and it is fair to say that, so far as we have seen, this contains few errors; but the descriptions do not give us the impression that the author knows the plants he writes about. For example, he not only figures and describes *Ranunculus auricomus* under the name “Buttercup,” but he omits any mention of the characteristically imperfect development of the petals which at once distinguishes it from its congeners and attracts the attention of the young collector. The figure does not show this, but every observer knows it. “Meadow Clover” is not *Trifolium medium*, which does not grow in meadows, but *T. pratense*; *Lotus* is certainly not the equivalent of “different species of Trefoil,” nor are these “sometimes known in Ireland as shamrock” (p. 56). The plant figured and described as *Oxalis corniculata* is that which we are accustomed to call *O. stricta*—Prof. Robinson promises us a note on this plant which will interest our readers; and the “Spring Crocus: *Crocus vernus*” is a yellow-flowered species, probably *C. aureus*. But the compilation as a whole is accurate.

The necessity of making the text fit the plates has resulted in the inclusion, as Mr. Kirby tells us in his preface, of “a few plants not found in the British Islands; but, with a single exception (*Globulariaceæ*) every order figured is represented in our British Flora.” What possible claim can so insignificant and unimportant an order have to inclusion in a book of this kind? The description of *Globularia vulgaris* occupies 26 lines; British plants are treated much more briefly—*Rubus Chamæmorus*, which happens to be open before us, takes 7. *Dianthus carthusianorum*, *Rhamnus alpina*, *Cytisus capitatus*, *Arnica montana*, *Pedicularis Sceptrum-Carolinum*, *Cerinthæ major*, *Hemerocallis flava*, are only some of the species figured and described in this book on “*British Flowering Plants*,” with many others whose names, though still retained in our manuals, have no claim to be regarded as British, or even as naturalized—e.g., *Epimedium alpinum*, *Sorbus domestica*, *Epilobium Dodonæi*, and *Trapa natans*, though this last, as Mr. Kirby points out, “was formerly a British plant, having been found by Mr. Clement Reid in the pleistocene deposits at Pakefield, Suffolk.”

There is a brief elementary introduction, illustrated by numerous small and very rough figures—the “119 illustrations in the text”—and a full index. The book is prettily got up and well printed.

Index Kewensis Plantarum Phanerogamarum supplementum primum nomina et synonyma omnium generum et specierum ab initio anni MDCCCLXXXVI usque ad finem anni MDCCCXLV [MDCCCXCV] complectens confecerunt THEOPHILUS DURAND et B. DAYDON JACKSON. Fasciculus iv. Bruxellis apud Alfredum Castaigne. 4to, pp. 329-519. Price 12s.

Genera Siphonogamarum ad Systema Englerianum conscripta ab autoribus Dr. C. G. DE DALLA TORRE et Dr. H. HARMS. Fasciculus octavus. Lipsiæ sumptibus G. Engelmann. 4to, pp. 561-640. Price 6 marks.

THE long delay in the completion of the first supplement to the *Index Kewensis* is explained by M. Durand in the preface to the volume, which is issued with the latest and last part, in a way which must command sympathy and prevent criticism: it is due, he tells us, to the state of his eye-sight, which at one time it was feared would result in total blindness. Owing to this "the completion of the work only became possible by printing with disheartening slowness, and the correction of proofs during many years has only been accomplished at the cost of actual suffering. These circumstances have been the cause of errors which otherwise would not have occurred," and M. Durand exonerates Mr. Jackson from any responsibility for these, and "relies on the indulgence of all those to whom this work will be of service." Such indulgence will be readily extended, with a feeling of thankfulness that by the completion of the work the index is brought down to the end of 1900, the second supplement having been concluded last year*; but it must be admitted that there is ground for its exercise, and it is to be regretted that M. Durand, or whoever is responsible for the actual production of the book, did not obtain expert help in reading and checking the proofs. Even the printer's reader, we think, might have corrected "Kuatze" (which we see in the first column of the first page) into Kuntze, seeing that that name is many times printed both before and after, and the reference is "l. c." On the same page the genus *Pierrea* is attributed to Hance, although the species are rightly ascribed to Heim; and both names are followed by a period, indicating abbreviation.

Leaving these details, of which we fear every page would yield more than one example, we are struck by the enormous increase of synonymy during the decade covered by this first supplement. This of course is largely due to the misdirected zeal of Dr. Otto Kuntze and his followers, who, as the editors of the supplement told us in the circular announcing its publication, "ont mis en circulation plus de quarante mille noms nouveaux"—names which have in numberless instances been made without any reference to the botany of the matter, and are thus merely useless encumbrances of nomenclature. Some, indeed, are the results of mere carelessness of transcription—e. g., *Pinalia biophylla* Kuntze was intended as a transference of *Fria leiophylla*. Engler's *Pflanzenfamilien* is responsible for another series of wholesale transfers, although in this

* See Journ. Bot. 1905, 275.

case the botany of the genus has been carefully gone into; the supersession by Dr. Harms of *Sciadophyllum** P. Browne (1756) in favour of *Schefflera* Forst. (1776), and the combining under the latter of genera hitherto held distinct has necessitated a large crop of new names. Such books as Nicholson's excellent *Dictionary of Gardening*, again, contribute their unnecessary quota; thus the first entry in the part of the Supplement before us is of two plants placed under *Physidium*, although the *Dictionary*, which so places them, says that the genus is "now regarded as synonymous with *Angelonia*" (under which the two plants were originally described), and gives no reason for its separation. Nor can we hope that the period of change has been terminated; the decision of the Vienna Congress that the oldest specific name must be retained will lead to a new crop of synonyms, and the best we anticipate is that "at last, far off," when those who have been active in matters of nomenclature have passed from the scene, some future Jackson will issue a new Index which will bring about something like finality in nomenclature. Meanwhile a severe reticence should be practised as to the creation of new combinations.

Two lists of "addenda et emendanda" are given at the end of the supplement—the first, "Curæ posteriores in Indicem Kewensem post annum 1895 notata," is by Mr. Jackson; the second, relating to the supplement, is by both authors. We regret that some public intimation was not given that the first of these was forthcoming, so that the supplementary list kept in the National Herbarium might have been included; we had thought, however, that such matter would have been reserved for the introduction to the whole work, which, we understand, Mr. Jackson still has in contemplation, and which is a necessary adjunct to the full understanding of the *Index*. The additions will themselves require emending; we note on the first page, "*Securigena*" for *Securinea*, "*quayaguilensis*" for *guayaquilensis*, "*Zelanthera*" for *Telanthera*. In the supplement to the *Supplement* a large number of garden names published in the *Handlist of Trees and Shrubs* grown at Kew are cited and assigned to their equivalents; "in this list," says its preface, "the names of some plants will be found which are accorded specific rank on account of their distinctness from a cultural point of view, although botanists would regard them as mere varieties." Unfortunately such names are in no way indicated, and thus go to swell the flood of useless synonymy. The list is understood to have been compiled by Mr. Nicholson, but his name is nowhere mentioned, so it is cited as "*Handl. Trees Kew*"; we are glad that in lists issued under the new Director the compiler's name will be given.

The *Genera Siphonogamarum*, which is for groups and genera what the *Index Kewensis* is for species, is also practically completed, as the eighth part, issued last month, contains the supplement and begins the index. As we said when the first part appeared,† it

* This is Browne's spelling, both in text and on plate; the *Index Kewensis* and authors generally write *Sciadophyllum*.

† Journ. Bot. 1900, 363.

must find a place in every reference library; the bibliography is very full and most carefully done, and the date of publication is given in every case—a boon which only those who are continually regretting its absence from the Kew Index can fully appreciate. We still desiderate an introduction which will give some account of the plan and scope of the work, but we assume this will be supplied with the concluding part.

In the list of "Genera incertæ sedis" we find some slight ground for criticism. We do not understand, for example, why *Raphanopsis* of Welwitsch finds a place here; the authors rightly cite Mr. Hiern's identification of it with *Oxygonum*, which is based upon the specimens collected and named by Welwitsch himself; where then is the uncertainty? A reference to the somewhat exhaustive paper on "Arruda's Brazilian Plants," published in this Journal for 1896 (pp. 242–250), would have enabled the authors to remove from the list of uncertainties *Carlotea* and *Skolemora*, and would have prevented them from following the *Index Kewensis* in printing the name "*Plegerina* Arruda," which was shown (*loc. cit.* 248) to have no existence apart from the *Index*; Mr. Jackson, in the supplement to the *Supplement*, takes due note of this, and of the identification of *Pleragina*—as Koster writes the name—with *Couepia*. "*Micræa* Miers," again, was shown (Journ. Bot. 1880, 20) on the authority of Miers's own specimen, named by himself, to be *Ruellia dulcis* Cav. It seems hardly worth while to place such identifications on record if they are to be ignored by those to whom one would think they would be of special interest. Probably further research than we have leisure to make would result in a further reduction of these plants "incertæ sedis"; *Petalostemma* of Robert Brown may be removed from them, as Salt's specimen, so named by Brown, is *Glossonema Boveanum*. We note that *Findlaya*—one of the five named and described but we fear undeterminable genera given in the appendix to Bowdich's *Excursions in Madeira* (1825)—is included, and that, following the *Index Kewensis*, it is entered as from Madeira; but these five, with many others described but not named, are not Madeira plants, but from "Banjole [Gambia] and its environs." These, however, are but small matters, and do not detract from the value of the work as a whole.

Jugendformen und Blütenreife im Pflanzenreich. Von Dr. L. DIELS.
8vo, pp. 130, tt. 30. Borntraeger. Berlin, 1906. Price
3 M. 80 pfg.

UNDER the above title Dr. Diels has brought together a number of examples of the association of the so-called "juvenile" vegetative form with the flower-bearing habit. In his botanical journey in West Australia the author was impressed with the number and variety of plants in which this phenomenon was shown, and the examples which he describes are partly from personal observation, and partly collected from botanical literature. Among the latter is the remarkable instance of the mahogany (*Swietenia Mahagoni* var.

præcociflora) recently described by Mr. Hemsley in Hooker's *Icones* (1905, t. 2786). A number of seedlings which were being raised in boxes in the Botanic Gardens, Trinidad, came into flower when only about eight inches high, and then resumed normal growth. The association of the flower with juvenile forms is also described in a number of species which are characterized by great polymorphy in foliage, including aquatic or marsh forms, such as species of *Ranunculus*, *Alismaceæ*, *Limosella*, and others; and also numerous xerophytic forms. Of the latter, Dr. Diels had the opportunity of studying examples in Western Australia, in species of *Hakea* and *Grevillea*. *Xanthosia*, an endemic Australian Umbellifer, numerous species of which are found in the south-west of the Continent, shows a remarkable variety in foliage, and the author points out an interesting relation between the earlier leaf-form of one species and the later leaf-form of another. Reference is also made to *Phylloglossum* as a juvenile form of *Lycopodium* of the type of *L. cernuum* which has been checked in development and has proceeded forthwith to formation of spores.

In this little volume Dr. Diels has made a useful contribution to the literature of a interesting phase of plant-development.

A. B. R.

Parasitisme et Mutualisme dans la Nature. Par le Dr. L. LALOY. 8vo, pp. viii, 284, tt. 82. F. Alcan. Paris: 1906. Price 6 fr.

THIS forms a volume of the *Bibliothèque Scientifique Internationale*, and is a semipopular account of those relations between plants and animals which are expressed by the terms Parasitism and Mutualism. The author cites various instances of parasitism of plants on other plants, and on animal hosts, and also of animals parasitic on plant-hosts and on other animals. Under Mutualism, the work of insects in pollination is discussed, and such phenomena as myrmecophily. From a purely zoological point of view the subject takes the form of the development of faunas and animal societies. One chapter is devoted to Mimicry, the illustrations of which are drawn mainly from the animal kingdom.

A. B. R.

How Ferns Grow. By MARGARET SLOSSON. New York: Henry Holt & Co. London: Bell & Sons. 1906. Pp. viii, 156. 46 plates. Price 12s. 6d. net.

MANY authors have written about the external form and minute structure of the mature fern-plant, the development of its spores, their germination, the prothallium or oophyte and its sexual organs, fertilization, and the development of the embryo sporophyte; and here their studies usually end. Very few appear to have paid any attention to the stages that intervene between the embryo and the mature plant—the period during which the successive fronds gradually lose more and more their original simplicity of form and venation, and assume the elaborate characters of maturity. It is these young undeveloped fronds that are so puzzling to the systematist.

The need of information about these immature fronds has been recognized by the author of the work under notice, in which the aim has been "to point out the principal features of the development of form and venation in fern-leaves, as seen in the species of the North-eastern United States." Beginning with a general chapter on the development of the fern-leaf, with an account of the various ways in which simple leaves become more and more compound, of the transition from free to anastomosing venation which occurs in certain species, the author passes on to the consideration of the North American species. Eighteen of these are treated, each in a chapter by itself. In each case a description of the mature plant is first given, and this is followed by a detailed account of the development of its leaves and their venation from the infant plantlet still attached to the prothallium to the fully elaborated mature frond. The book is freely illustrated, some ten to twelve photographic figures being allotted to the successive stages of each species. These figures will be of great utility to pteridologists and cultivators of ferns. Four of the species discussed grow in this country—*Asplenium Ruta-muraria*, *A. Trichomanes*, *Scolopendrium vulgare*, *Polypodium vulgare*.

A. G.

BOOK-NOTES, NEWS, &c.

At the meeting of the Linnean Society on 21st June, Miss L. S. Gibbs read an abstract of her paper, "A Contribution to the Botany of Southern Rhodesia," illustrating her remarks by lantern-slides from her own negatives. The collections on which the report was based were obtained in August to October, 1905, at the end of the dry season. The air is dry and the sun's rays very strong, temperature from 80° to 90°, so that the country presented a burnt-up aspect, and the trees were bare, except a few evergreens. The veld is systematically burned to promote young growth for cattle-food, to the detriment or destruction of trees and shrubs. Distribution of species is wide, and the present paper tends to a confirmation, with many new records. Twenty-three new species are described, amongst the more interesting being the grass *Erianthus teretifolius* Stapf, and a characteristic *Elephantorrhiza*. Mr. Carruthers read a paper on "The Authentic Portraits of Linnæus," with lantern-slides. He recalled the fact that in 1889 he made the subject the chief topic of his address at the anniversary meeting on 24th May of that year; he subsequently visited Sweden, Germany, and the Netherlands to inspect the originals, and read a paper detailing his results at the general meeting held on 19th November, 1891; a transcript of his remarks had been prepared but did not satisfy him, and nothing was published. The approaching bicentenary celebration of the birthday of Linnæus, for which the Swedes have been making extensive preparations, had induced him to revise his old transcript and add some recently ascertained facts. A third paper was by Dr. Otto Stapf, F.L.S., entitled "*Plantæ novæ Daweanæ* in

Uganda lectæ." Mr. M. T. Dawe, officer in charge of the Forestry and Scientific Department of the Uganda Protectorate, made an expedition from Entebbe, through Buddu and the Western and Nile provinces of that territory. His collections were transmitted from time to time to Kew, and his report was issued as the Blue Book to which we referred on p. 286. Much light is thrown on distribution, and the new species are described, the names of which are published in the Blue Book, amongst them a new genus of *Rutaceæ*, *Balsamocitrus* Stapf, and a new species of *Warburgia* (*Canellaceæ*). As an appendix Mr. Dawe gives a summary of his report on the vegetation of the country traversed.

THE part (vol. iv. no. 131) of the *Bulletin of the New York Botanical Garden* issued June 25 contains an important monograph of the *Characeæ* of North America, by Mr. C. B. Robinson, which we hope to notice later; a revision of North American *Vernoniæ*, by Mr. H. A. Gleason; descriptions of new American Coralline Algæ, by Messrs. Foslie and M. A. Howe; and two parts of his Flora of the Bahama Islands, by Dr. Britton. We note that "each paper was issued separately, in advance, on the date indicated" in the table of contents; these dates range from "Au 1905" to "Mr" and "Je" 1906; it is, we think, a matter for discussion how far these issues in advance constitute publication.

It is good news that the long-promised Guide to Kew Gardens, the absence of which was the subject of numerous questions in the House of Commons during the late directorate, is at last to make its appearance. Replying to a question by Mr. Money on July 16, Sir E. Strachey said that the preparation of an official guide to Kew Gardens had kindly been undertaken by Sir William Thiselton-Dyer, the late director, and it would be completed and placed on sale at the earliest possible date. Now that Sir William has been relieved of his official duties, he will have leisure wherein to carry out an undertaking for which he is eminently qualified, and we trust that the delays which attended the production of certain other works with the production of which he was associated will not interfere with the completion of this much-needed Guide.

FASCICLE X. of Herr Carl Christensen's *Index Filicum* (Copenhagen: Hagerup. Pp. 577-640) carries this important and indispensable work forward another stage towards completion. It starts amid the numerous forms of *Polystichum aculeatum*, geographically grouped by the author, and, passing by way of *Pteris*, *Schizaa*, and *Stenochlæna*, proceeds alphabetically to *Trichomanes gibberosum*. The original estimate was that the book would be completed in ten or twelve parts. There ought not to be any difficulty in compressing the remainder of the species-index, together with the systematic enumeration of genera and the alphabetical catalogue of literature, within the limits allotted.

MM. EL. & EM. MARCHAL, in their *Recherches Physiologiques sur l'Amidon chez les Bryophytes* (Bull. Soc. Roy. Bot. Belgique, xliii. pp. 115-214), give a detailed account of their experiments made upon some fifty hepatics and ninety mosses, with a view to deter-

mining the existence and localization of starch in their tissues. Their first list of the species is systematic. For convenience they then rearrange the species in three groups according to whether they contain much, little, or no starch. In the first group are twenty-seven hepatics and fifty-two mosses; in the second, twelve hepatics and twenty-four mosses; in the third, eleven hepatics and fourteen mosses. Types of the first group, in which the plants maintain a constant freshness, are *Cincinnulus Trichomanis*, *Atrichum undulatum*; types of the second group, exposed to short and rare periods of desiccation, are *Lophocolea bidentata*, *Ceratodon purpureus*; types of the third group, adapted to withstand prolonged desiccation, are *Radula complanata*, *Neckera crispa*. In this last group the starchy stores are replaced by sugars and fatty matters. In testing the effect which light, heat, water, and nutritive solutions respectively have upon the production and fluctuation of the stores of starch, the authors found that the *Muscineæ* react in precisely the same way as do the chlorophyllose phanerogams.—A. G.

THE *Journal of the Linnean Society* issued in July—the only number since Sept. 30, 1905—contains descriptions of new Malayan *Cyrtandraceæ* by Dr. Kränzlin; a paper on Cape *Characeæ* by the Messrs. Groves; a new genus of *Coniferaæ* (*Taiwania*) from Formosa, by Bunzō Hayata; a paper by Mr. A. D. Cotton on endophytic Algæ; and a contribution to the *Rubiaceæ* and *Compositæ* of Africa by Mr. Spencer Moore. Among other plants of interest, Mr. Moore figures and describes, from authentic specimens in the National Herbarium, two obscure plants—*Bembycodium Athanasiaæ* Kunze and *Sphenogyne brachyloba* Kunze.

MR. PERRÉDÈS is contributing to the *American Journal of Pharmacy* an interesting series of illustrated articles on “London Botanic Gardens.” The papers will, we understand, be reprinted in a volume, when we hope to have an opportunity of noticing them. There are evidently statements which need correction: *e. g.* it is stated in the article on Kew that “the herbarium of Sir Joseph Banks, his scientific library, and the collection of Bauer’s drawings had all been transferred to the British Museum after his [Banks’s] death:” of course the Banksian herbarium was never at Kew.

THE *Kew Bulletin* seems to have taken a new lease of life, and we congratulate the new Director on his success in overcoming difficulties which hitherto were apparently insuperable. Nos. 4 and 5 contain, besides descriptions of new Chinese and African plants and new orchids, lists of additions to the Herbarium during 1901–3. This is certainly a case of “better late than never”; we have more than once commented on the inconvenience which the cessation of this and other items of information formerly published in the annual reports of the Gardens would cause to those desirous of knowing what collections were to be found at Kew.

WE regret to record the death of Mr. Charles Baron Clarke, which took place at Kew on Aug. 25, and of Prof. Marshall Ward, at Torquay on the next day. Notices of the deceased botanists will be published later.

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THE JOURNAL OF BOTANY was established in 1863 by Dr. Seemann. In 1872 the editorship was assumed by Dr. Henry Trimen, who, assisted during part of the time by Mr. J. G. Baker and Mr. Spencer Moore, carried it on until the end of 1879, when he left England for Ceylon. Since then it has been in the hands of the present Editor.

Without professing to occupy the vast field of general Botany, the Journal has from its inception filled a position which, even now, is covered by no other periodical. It affords a ready and prompt medium for the publication of new discoveries, and appears regularly and punctually on the 1st of each month. While more especially concerned with systematic botany, observations of every kind are welcomed. Especial prominence has from the first been given to British botany, and it may safely be said that nothing of primary importance bearing upon this subject has remained unnoticed.

Bibliographical matters have also received and continue to receive considerable attention, and the history of many obscure publications has been elucidated. Every number contains reviews of new and important books written by competent critics: in this as in every other respect a strictly independent attitude has been maintained. While in no way officially connected with the Department of Botany of the British Museum, the Journal has from the first been controlled by those whose acquaintance with the National Herbarium has enabled them to utilize its pages for recording facts of interest and importance regarding the priceless botanical collections which the Museum contains. In 1896 it became necessary to increase the size of the Journal, owing to the number of papers sent for publication: the number of plates was at the same time augmented.

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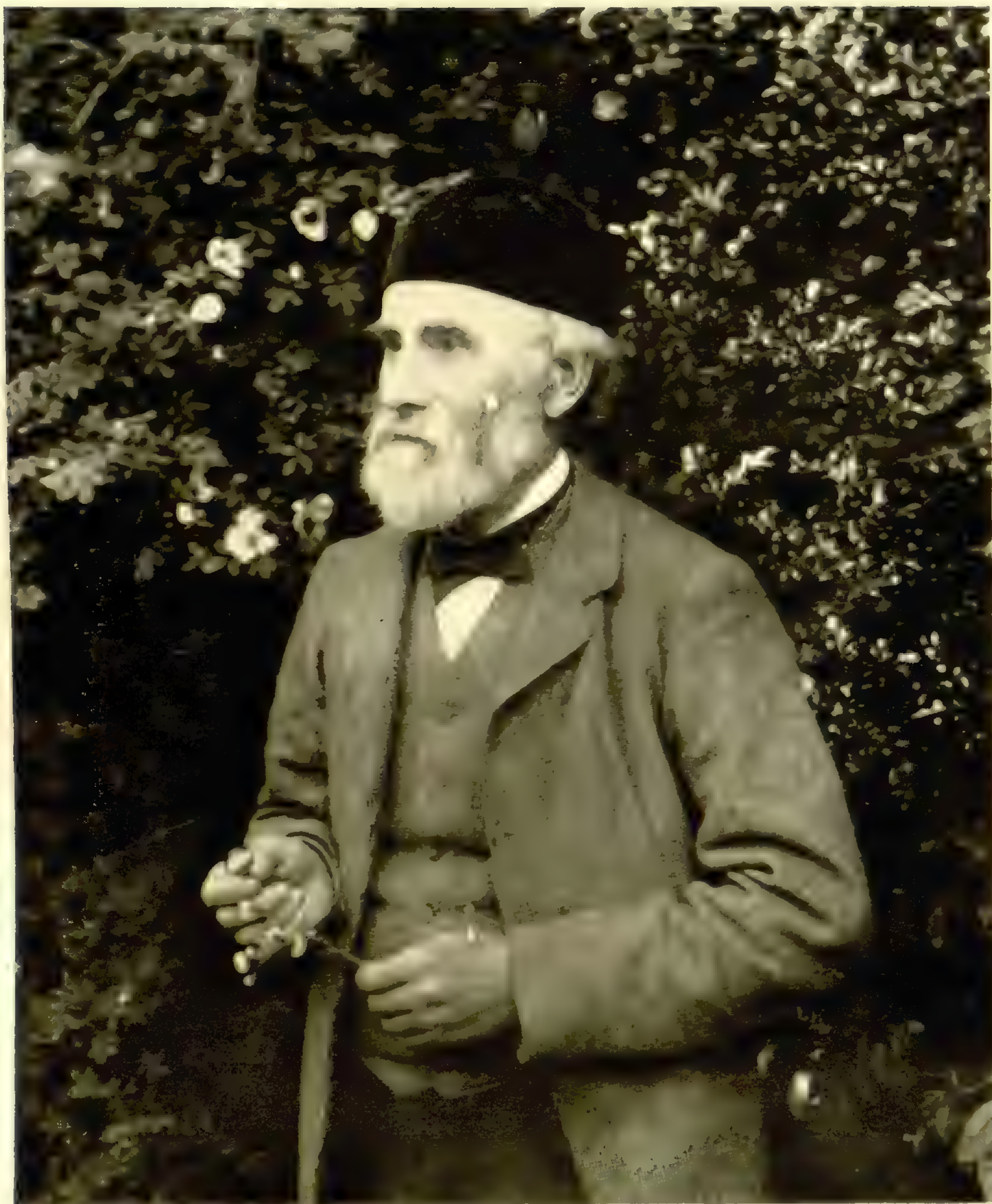
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WILLIAM MITTEN

WILLIAM MITTEN.

(WITH PORTRAIT.)

WILLIAM MITTEN, the accomplished bryologist, who passed away on Friday, July 27th, in his eighty-seventh year, was born at Hurstpierpoint, Sussex, on Nov. 30th, 1819. By profession he was a pharmaceutical chemist, and early in life he joined to this the study of botany, devoting most of his spare time to it; but for many years, as he wrote to Sir William Hooker, Sundays were the only days he could go into the fields. At first he studied nearly all classes of British plants, and his investigations were always of a critical character. Encouraged by Borrer and Sir William Hooker, he paid special attention to mosses and liverworts generally, and he soon became one of the leading authorities on these groups. His first contribution to botanical literature, I believe, is a record in the *Phytologist*, vol. i. p. 203, May, 1842, of the discovery of *Bupleurum tenuissimum* near Highgate. His next communication to this publication is on the differential characters of *Linaria spuria* and *L. Flatine*, followed, in May, 1843, by a record of the discovery, near Erith, of *Bryum androgynum* in fruit. It was in May, 1843, too, that he discovered *Carex montana*, near Eridge, Sussex, though the fact was not put on record till 1845. This was the first record for the British Islands, and Edward Jenner's station at Heathfield, Sussex, 1849, was apparently the second. It has since been collected in nine other English counties from Kent to Devon and Shropshire.

From his own writings we learn that Mitten made the acquaintance of his neighbour, William Borrer, early in his career, and through him, probably, he entered into correspondence with Sir William Hooker. His first letter to Sir William is dated from Hurstpierpoint, Dec. 8th, 1846, and relates to the parasitism of *Thesium* and *Cuscuta*, in connection with his paper on the former, which appeared in Hooker's *London Journal of Botany* in 1847, and was repeated in the *Phytologist* and the *Annales des Sciences Naturelles*. This article furnishes evidence that Mitten was a keen observer, and its reproduction in the *Annales* shows that it was of more than ordinary interest. It was followed by many records of discoveries, especially of mosses new to Britain, and notes on "critical species." Respecting his "Descriptions of some Plants new to the British Flora" (Hook. Lond. Journ. Bot. vii. 1848, p. 528) he has the following remarks:—"I cannot but expect that by some plant-gatherers these plants will be considered mere 'splits'; but, commending them to the examination of field-botanists, I will be content to say with Nees ab Esenbeck: 'Malo enim peccare in discriminandis quam in confundendis rerum naturæ cognitionibus.'" He acknowledges here his indebtedness to Borrer—"without the very valuable assistance of his herbarium and library I could not have been positive that my plants were precisely those of foreign authors."

The plants described are: *Potentilla mixta* Nolte, *Filago Jussii* Coss. & Germ. (*F. spathulata* Presl), *Mercurialis ovata* Sternb. & Hoppe, *Carex Kochiana* DC., *Lolium linicola* Sond., and *Triticum biflorum* Brign. A few pages further on he has the first British record of *Fumaria confusa* Jord., under the name of *F. agraria*. Mitten was also a contributor to the *Supplement to English Botany*, both as discoverer and author; he wrote the descriptions of *Gymnomitrium adustum* (t. 2925) and *Lolium linicola* (t. 2955).

By this date (1848) Mitten had begun the study of exotic as well as native mosses and liverworts, and travellers were already sending him collections from various parts of the world; but he published little before 1851. Both T. Taylor and W. Wilson had hitherto been associated with the Hookers in working out various collections, but the former died in 1848, and Mitten, as he states in one of his letters to Sir William Hooker, had then to rely on his own judgement so far as liverworts were concerned. Mitten's letters of this period to Hooker contain many interesting facts, especially as to his numerous discoveries in his own neighbourhood. Borrer discovered *Leersia oryzoides* in three places on Henfield Level, in 1844, and Mitten collected it at Pond Leigh, near Cuckfield, in 1847—the first two records for Britain.

In 1849 Sir William Hooker offered Mitten the curatorship of his herbarium, in the place of J. E. Planchon; but he declined it on the ground that he had a young family around him, for which he was bound to do his best; and with that view he had made arrangements to take over the business of a chemist at Hurstpierpoint. This business he held until his death, assisted for many years by his daughter Flora, herself a qualified practitioner, who now succeeds him. He had, I believe, no other assistance; but, as he wrote in 1854, he had "a good deal of time to devote to the study of Musci, &c., though it was made up of little bits." In the same letter he states that he had only been away from home for two week-days for five years—one to see the Exhibition, and one to see Borrer! In spite of all interruptions he accomplished an immense amount of botanical work. From about this time, and for many years, most of the Kew collections of mosses and liverworts were sent to him for determination; the last collection was returned named in 1891.

In 1851 Mitten commenced publishing, in the *Annals of Natural History*, "A List of all the Mosses and Hepaticæ hitherto observed in Sussex," but this was never completed. The same year he published his first contribution to the Moss-Flora of South America. This was crowned, in 1869, by what may be termed his *magnum opus*, the "Musci Austro-Americani," which occupies the whole of the twelfth volume (upwards of 650 pages) of the *Journal of the Linnean Society*. The basis of this was the very fine collection made by Richard Spruce; about 1750 species, belonging to 127 genera, are described.

The Royal Society's *Catalogue of Scientific Papers*, down to 1883, gives the titles of forty contributions by Mitten to various botanical publications, but this list is by no means exhaustive. For example,

he described the *Hepaticæ* for Sir Joseph Hooker's *Flora Novæ Zelandiæ* (1855), and for his *Flora Tasmaniæ* (1860); and later (1884) he worked out both the *Hepaticæ* and the *Musci* for my *Report on the Botany of the Challenger Expedition*. In 1891 he published "An Enumeration of all the Species of *Musci* and *Hepaticæ* recorded from Japan." Recorded is not the right word in this title, because many of the species were previously undescribed. His last paper, I believe, was on the *Musci* and *Hepaticæ* of Mount Kinibalu, Borneo; it was prepared in conjunction with Mr. C. H. Wright, of the Kew Herbarium, and published in 1894.

Mitten was an occasional contributor to this Journal; his first contribution was on *Hypnum abietinum*, appearing in vol. i. (Journ. Bot. 1863, 356); his last a short memoir (Journ. Bot. 1893, 311) of C. Parker Smith, who was also a Sussex muscologist. It may be mentioned here, as a not generally known fact, that Mitten published, or issued, a lithographed list of British Mosses in 1866.

So much for Mitten's work, which I have not attempted to qualify except in general terms, because most of it is outside of my province. My personal knowledge of him enables me to say that everything he undertook was carried out in a methodical, thorough, and conscientious manner. He seldom visited London, or, indeed, left home; so that he was personally known to comparatively few botanists. In a local notice of his death he is truthfully described as a man of serene temper, with a strong vein of humour, and a very keen perception. Tributes of respect were very numerous at his funeral, which was attended by the leading residents of Hurstpierpoint.

I first became acquainted with him in 1859 or 1860, when I was living at Hassocks, and applied to him for assistance in naming British plants. He received me with great kindness and encouragement, and when I returned, unwell, to Hassocks in 1867, one of my greatest pleasures was to go to Hurst, and have a talk with him. He had correspondents in all parts of the world, from whom he received many things besides mosses, including seeds for his garden, of which he was very fond. I remember how keenly he examined his mosses and liverworts for chance seeds of other plants, and how much pleasure he derived from observing their germination and growth. In this way he raised several things from remote islands visited by the 'Challenger' Expedition.

His connections with scientific societies were all of an honorary character. In January, 1847, he was elected an Associate of the Linnean Society of London, and he was also an honorary member of the Brighton Natural History Society, of the South Eastern Union of Scientific Societies, of the Linnean Society of New South Wales, and of the New Zealand Institute.

Mittenia Lindberg (in Oefvers, Kong. Vetens. Akad. Foerh. ix. 1863, p. 606) was founded on *Mniopsis Plumula* Mitt. (in Hook. Fl. Tasm. ii. p. 187, t. 173, f. 7), the name *Mniopsis* being already in use. Looking into this matter brought to light the fact that although W. Wilson is the nominal author of the *Musci* in the latter work, Mitten contributed many original drawings and descriptions. *Mittenia* of Gottsche (Ann. Sc. Nat. 5 S. i, 177 (1864) = *Pallavicinus* Gray (1821).

Myosotis collina var. *Mittenii* Baker (Journ. Bot. viii. 1870, p. 244)—a form not now regarded as of much importance—was discovered by Mitten at Hurstpierpoint in 1845.

Mitten leaves a widow, who is ninety-three years of age, and four daughters, one of whom is the wife of Dr. A. R. Wallace.

W. BOTTING HEMSLEY.

THE FLORA OF CYPRUS.

By HAROLD STUART THOMPSON, F.L.S.

(Concluded from p. 309.)

COMPOSITÆ.

Erigeron canadense L. (with very dense tomentum). Garden, *Lascelles*!

Bellis sylvestris Cyrill. Near Prodromo, *Kotschy* (706 a); Aghridhi, *Lascelles*!

B. annua L. Near Paphos, *Kotschy* (63).

Pallenis spinosa L. Near Mazoto (554); Plain of Paphos, *Kotschy* (661); fields near Rhizo Carpasso, *Sintenis* (317!).

Inula Conyza DC. Foot of Mount Machaira, *Post*; road from Troodos to Prodromo, *Lascelles*!

I. graveolens L. Cyprus, not located, *Lascelles*!

I. britannica L. Near Prodromo, *Kotschy*.

Pulicaria dysenterica L. Lapithos, *Post*; slopes of Troodos, *Kotschy*.

P. sicula L. Near Larnaka, *Kotschy* (978).

Phagnalon græcum Boiss. St. Hilarion, *Post*.

Micropus erectus L. Near Larnaka on conglomerate, *Kotschy* (476); Cyprus, *Sibth*.

Filago germanica L. About Machera, *Kotschy* (238 a). *Kotschy* also records the var. *eriocephala* Guss. from near Larnaka (266).

F. gallica L. Near the Monastery of Chrysostomo, *Kotschy* (439 a).

F. arvensis L. var. β *Lagopus* DC. Wood near Prodromo, *Kotschy* (845).

F. prostrata Parlat. Near Larnaka, *Kotschy* (268 a).

Achillea cretica L. Near Synkrasi, *Kotschy*; Famagusta, *Lascelles*!

Anthemis arvensis L. About Larnaka and Colossus, *Kotschy*.

A. peregrina L. Occasionally in Cyprus, *Kotschy*.

A. montana L. var. *tenuiloba* Boiss. Cyprus, *Sibth*.

Artemisia campestris L. Garden, *Lascelles*!

Calendula arvensis L. North side of Troodos (6); Limasol (462); near Larnaka, *Kotschy* (122). *Kotschy*'s no. 251 from Limasol is *C. Persica* C. A. Meyer var. *gracilis* (*fide* Boissier).

Gundelia Tournefortii L. Sea-shore, Paphos, *Lascelles*! Between Limasol and Colossi towards Cape Gatto, *Kotschy*.

Xeranthemum squarrosum Boiss. Lapithos Pass, *Lascelles* !
Sintenis's no. 547 from Pentadactylon (in Herb. Kew.), named
var. *pictum*, Fl. Or., is *X. inapertum* Willd. according to Boissier.

Carlina Curetum Heldr. Between Platres and Pera Pedia,
Lascelles !

**C. lanata* var. *pygmæa* Post. Mountains of Cyprus, *Post* ; above
the Elias Bridge, *Lascelles* !

Lappa major Gaertn. Trooditissa, *Lascelles* !

Carduus pycnocephalus Jacq. Cyprus, *Samson* !

C. acanthoides L. Cyprus, *Sibth.*

Cirsium lanceolatum L. Kippalunga, *Post.*

C. Acarna L. Between Panteleimon and Nicosia, *Gaudry.*

Silybum Marianum Gaertn. Cyprus, *Sibth.*

Cynara Cardunculus L. Plain of Nicosia, *Post* ; Cyprus,
scattered, *Kotschy.*

C. horrida Ait. Between Panteleimon and Paleo Milo, *Kotschy*
(942).

Onopordon Sibthorpiatum Boiss. & Helr. Foot of Troodos,
Post ; near Bellapais, *Sintenis* (545 !).

O. virens DC. Foot of Pentadactylon, *Kotschy* (346).

Centaurea Behen L. Cyprus, *Sibth.*

C. solstitialis L. Near Synkrasi, *Kotschy* (541 a).

Crupina vulgaris Cass. Cyprus, *Kotschy.*

Carthamus lanatus L. Plains, *Post* ; near Sykhari, *Lascelles* !
near Chrysostomo, *Kotschy* !

Cnicus benedictus L. Near Lapethus, *Kotschy.*

Scolymus hispanicus L. Fields near Larnaka, &c., *Kotschy.*

Cichorium Intybus L. Between Chrysostomo and Cerinia, *Kotschy.*

Arnoseris pusilla Gaertn. Woods near Prodromo, *Kotschy* (814).

Hedypnois cretica L. Near Larnaka by the sea, *Kotschy* (460).

Rhagadiolus stellatus DC. Near Larnaka (84), near Episcopi
(614), and Pentadactylon, *Kotschy* (365).

Tolpis altissima Pers. Above Kampos, *Post* ; Cyprus, *Lascelles* !

Picris longirostris var. *Kotschyi* Sch. Bip. Roadsides, Cyprus,
Lascelles !

Tragopogon buphthalmoides Boiss. Fields, Cyprus, *Post.*

T. australe Jord. Summit of Troodos on north side, *Kotschy*
(776 !).

Scorzonera Jacquiniiana Koch. Troodos, *Post.*

S. papposa DC. Kampos, *Post.*

S. mollis M. & B. Cyprus, *Lascelles* !

Taraxacum gymnanthum DC. Near Paphos, *Kotschy* (57).

Chondrilla juncea L. About Ktima, near Paphos, *Kotschy* (64 !);
above Kampos, *Post.*

Seriola æthnensis L. Near Limasol (978) ; Cape Greece,
Kotschy (156).

Sonchus oleraceus L. Near Limasol and Larnaka, *Kotschy* (459).

S. arvensis L. Cape Greece, *Kotschy* (159).

Lactuca saligna L. Everywhere, *Post.*

L. cretica Desf. Near Melandrina and towards Heptacomí,
Kotschy (507, 597).

Picridium vulgare Desf. Cyprus, *Sibth.*

Crepis Dioscoridis L. Ayios Hilarion, *Lascelles* !

C. pulchra L. Cyprus, *Sibth.* ; Court Garden, *Lascelles* !

Pterotheca bifida Fisch. Near Larnaka (85); Prodromo, *Kotschy* (856).

CAMPANULACEÆ.

Campanula Erinus L. In several places, *Sibth.* ; near Larnaka, *Kotschy* (103).

C. drabaefolia *Sibth.* On rocks in Cyprus, *Sibth.*

Specularia Speculum DC. Ayios Hilarion, *Lascelles* ! fields near Kephalarissa, *Sintenis* (604 !).

S. hybrida L. Below Trooditissa Convent, *Kotschy* (800).

ERICACEÆ.

Erica verticillata Forsk. Cyprus, *Lascelles* !

PRIMULACEÆ.

Samolus Valerandi L. Troodos, *Post* ; in the Grotto of Hauptquelle above Kithrea, *Kotschy* (322) ; Cyprus, *Lascelles* !

Anagallis cœrulea Schreb. Collected in several places by *Sintenis* and others !

Cyclamen repandum *Sibth.* Ericon, *Post*.

Androsace maxima L. Between Trooditissa Convent and Omodos, *Kotschy* (881 !); fields near Nicosia, *Sintenis* (26 !).

PLUMBAGINEÆ.

Statice Limonium L. γ *macroclada* Boiss. Larnaka, towards Livadia, *Kotschy*.

S. virgata Willd. Saltmarsh at Larnaka, *Post*.

Plumbago europæa L. Cyprus, *Lascelles* !

ASCLEPIADEÆ.

Vincetoxicum officinale Moench. Cyprus, *Lascelles* !

GENTIANACEÆ.

Chlora serotina Koch. Alektriona, *Post*.

C. perfoliata Willd. Near Prodromo, *Kotschy* (615 a !).

Erythræa Centaurium Pers. Troodos, *Post*. — Var. β *laxa*. Cyprus, *Lascelles* !

E. ramosissima Pers. Near Prodromo, *Kotschy* (615 !); Tsorda, *Lascelles* !

CONVOLVULACEÆ.

Convolvulus cœlesyriacus Boiss. Ayia Neophyto, *Lascelles* !

C. arvensis L. Near Larnaka and Palio Milo, *Kotschy* ; Garden, *Lascelles* !

C. lineatus L. var. *angustifolius* *Kotschy*. Cape Gatto, *Kotschy* (627).

Calystegia sepium L. Near Chrysostomo, *Kotschy*.

Cressa cretica L. Cape Gatto, near Limasol, *Kotschy*.

Cuscuta Epithymum L. On Labiates, east of Buffavento, *Kotschy* (421) ; on *Paliurus*, common, *Lascelles* !

BORAGINÆÆ.

Heliotropium undulatum Vahl. Cyprus, "common everywhere," *Lascelles*!

H. europæum L. Woods above Prodromo, *Gaudry* (835).

Anchusa italica Retz. Near Paphos and Prodromo, *Kotschy* (846!); Plains, *Post*.

A. strigosa Labill. Between Nicosia and Cerinia, *Kotschy* (453!).

Nonnea philistæa Boiss. Cyprus, not located, *Lascelles*!

Onosma frutescens Lam. Ayios Hilarion, *Lascelles*!

O. orientalis L. Fields under Sta. Croce, *Sibth*.

Echium plantagineum L. Near Arigina, *Sintenis* (532!).

E. italicum L. Near Arora, *Kotschy* (667!).

Lithospermum arvense L. Near Prodromo, *Kotschy* (890!).

L. tenuiflorum L. Base of Sta. Croce, *Kotschy* (201a!).

Alkanna tinctoria L. Cyprus, *Sibth*.

Myosotis Idæa Boiss. & Heldr. North side of the summit of Troodos, *Kotschy* (716).

M. stricta Link. Troodos, Sta. Croce, *Kotschy* (201).

Cynoglossum pictum Ait. Cape Greece (123); near Prodromo, *Kotschy* (868!).

Asperugo procumbens L. Rubbish-heaps in Cyprus, *Sibth*.

SOLANACEÆ.

Solanum villosum Lam. Troodos, *Gaudry*; between Colossi and Paphos, *Kotschy*; Cyprus, Hagios Andronikos, *Sintenis* (675!).

S. nigrum L. Between Colossi and Paphos, *Kotschy* (613); about the Trooditissa Convent, *Gaudry*.

Lycium europæum L. Near Larnaka, *Sintenis* (926!).

Hyoscyamus albus L. Castle Regina, near Nicosia; near Mazoto, *Kotschy* (552!).

SCROPHULARIACEÆ.

Verbascum sinuatum L. Near Evrico, towards Solia (916), and near Panteleimon, *Kotschy* (947).

Linaria Elatine Mill. Fields in Cyprus, *Sibth*.

L. Elatine var. *villosa* Boiss. Hills west of Platres, *Lascelles*!

L. spuria L. Garden at Evrico, *Kotschy*.

L. chalepensis L. Cyprus, a single specimen, *Sibth*.

L. albifrons Sibth. & Smith. Garden, *Lascelles*!

Antirrhinum Orontium L. Near Larnaka (76), and Prodromo, *Kotschy* (913!).

Scrophularia sphærocarpa Boiss. Cyprus, *Sibth*.; everywhere, *Post*.

Veronica Anagallis L. Everywhere in water, *Post*, *Gaudry*.

V. Beccabunga Boiss. Cyprus, *Lascelles*!

V. cæspitosa Boiss. North side of the summit of Troodos, *Kotschy*.

V. triphyllos L. Ploughed land near Prodromo, *Kotschy*.

V. hederæfolia L. Cyprus, *Sibth*.

Trixago Apula Stev. On the way from Ktima to Arora, *Kotschy* (676!).

Odontites lutea L. Cyprus, *Lascelles*!

Rhinanthus minor Ehrh. Cyprus, *Samson*!

Euphrasia latifolia Griseb. Near Larnaka, Kotschy (206).
E. viscosa DC. Valley of Chrysoku, Kotschy.

OROBANCHACEÆ.

Phelipæa lavandulacea Reichenb. Nicosia, Post.
P. ramosa C. A. Meyer var. *Muteli* F. Schultz. Pentadactylon,
 Lascelles! Sintenis's no. 38 in Herb. Kew.! (sub *P. ægyptiaca*
 Pers.) is this species.

ACANTHACEÆ.

Acanthus mollis L. Cyprus, Lascelles!

VERBENACEÆ.

Verbena officinalis L. About Larnaka, Kotschy; Lascelles!
Vitex Agnus-castus L. Everywhere, Post; stream near Kala-
 panayiotis, Lascelles!

LABIATÆ.

Lavandula Stæchas L. Several localities, Kotschy.
Mentha sylvestris L. Near the Trooditissa Monastery, Kotschy (23)
M. Pulegium L. Near Forni, Kotschy (970!).
Origanum Maru L. St. Hilarion, Lascelles! Kotschy records this
 plant as *O. Majorana* L., from between Panteleimon and Paleo Milo
 (937). Mr. Lascelles also collected the var. *viridulum*!
O. cordifolium Montb. Mountains of Kikko, Post.
Thymbra spicata L. Cyprus, Clarke; Lascelles!
Satureja spinosa L. In the lowlands, Gaudry.
Micromeria græca L. var. *laxiflora* Post. St. Hilarion, Post.
Calamintha Nepeta L. Near Chrysorojiatiza, Post.
 **C. Troodii* Post. Troodos, Post.
C. cretica Benth. Troodos, Kotschy (734a).
Melissa officinalis L. Near Prodromo, Kotschy!
Salvia pinnata L. Above the Melandrina Monastery, and near
 Antiphoniti, Kotschy (528).
S. viridis L. Near Larnaka, &c., Kotschy!
S. Horminum L. Cyprus, Sibth.; near Larnaka, Kotschy (38!);
 Ashuriton, Lascelles!
Nepeta Sibthorpii Benth. Troodos, Lascelles!
N. orientalis Mill. Mountains, Post.
N. Cataria L. Near Papho and Prodromo, Kotschy.
N. Mussini Henk. Heights of Troodos, Kotschy (773).
Scutellaria utriculata Lab. Cyprus, Lascelles!
S. albida L. Ayios Hilarion, Lascelles!
Marrubium vulgare L. Near Pisuri, Kotschy (628); Nicosia,
 Post; roadsides, Lascelles!
Sideritis pullulans Vent. In cypress woods near Chrysostomo,
 Kotschy (391).
 **S. cypria* Post. Castle of St. Hilarion, Post.
Lamium amplexicaule L. About Haggia Napa, &c., Kotschy
 (112a).
Molucella lævis L. Between Athienu and Larnaka Kotschy,
 (975!).
M. spinosa L. Papho, Lascelles!

Ballota nigra L. Near Evrico, 1840, *Kotschy* (8!); Trooditissa, *Lascelles*!

Phlomis fruticosa L. Cyprus, *Sintenis et Rigo*!

**P. cypria* Post. Castle of St. Hilarion, *Post*.

**P. Bertrami* Post. Cyprus, *Post*.

P. lunarifolia Sibth. & Smith. Cyprus, *Sibth.* in *Herb. Oxon.*!
Near Chrysoku, *Kotschy* (678)! Cyprus, *Samson*!

Prasium majus L. Near Haggia Napa (133); Chrysostomo (411); Cape Gatto, by Lamias, *Kotschy* (606!); Paphos, *Post*; rocks between Sykkari and Dikomo, *Lascelles*!

Ajuga Chia Schreb. Pentedactylon, *Lascelles*!

Teucrium scordioides Schreb. Near Chrysostomo, *Kotschy* (949); near Evriku, *Sintenis* (735!).

PLANTAGINEÆ.

Plantago major L. Larnaka, *Lascelles*!; Cyprus, *Sintenis* (621!).

P. lanceolata L. Abbot's Ditch, *Lascelles*!; Cyprus, *Sintenis* (1880!).

P. Lagopus L. Near Larnaka (39, 148, 323); Episcopi, *Kotschy* (654); Cyprus, *Samson*!

P. Coronopus L. Near Larnaka and Cape Gatto, *Kotschy* (603a).

P. Psyllium L. Near Larnaka (40); near Chrysostomo, *Kotschy* (398).

CHENOPODIACEÆ.

Chenopodium rubrum L. Cyprus, *Samson*!

Blitum virgatum L. Troodos, *Post*; vineyards near Prodromo, *Sintenis* (753!); Troodos, common, *Lascelles*!

Atriplex portulacoides L. Larnaka, *Post*.

A. leucocladum Boiss. Nicosia, *Post*.

A. Halimus L. Salt marsh near Larnaka and Cape Gatto, *Kotschy*.

Echinopsilon hirsutus Moq. Cyprus, *Sibth.*

Suaeda pruinosa Lange. = *S. vera* Forsk. Larnaka, *Lascelles*!

Salsola inermis Forsk. Salt marsh, Larnaka, *Post*.

Noea spinosissima L. Troodos, *Post*; Cyprus, *Gaudry*.

POLYGONACEÆ.

Polygononum Bellardi All. Plains, *Post*.

P. equisetiforme Sibth. & Smith. Cyprus, *Lascelles*!

Emex spinosus, L. Cape Gatto, *Kotschy* (626a),

Rumex Patientia L. Trooditissa Monastery, *Kotschy* (795).

R. bucephalophorus L. Near Larnaka, *Kotschy*!; Cyprus, *Miss Samson*!

R. pulcher L. Near Larnaka, *Kotschy* (31a).

THYMELÆACEÆ

Thymelæa hirsuta L. Cape Gatto, and near Larnaka, *Kotschy*; Larnaka Salt Lake, *Lascelles*!

ELEAGNACEÆ.

Elæagnus angustifolia L. Cyprus (possibly cultivated), *Sintenis*!

SANTALACEÆ.

Osyris alba L. Near Limasol, *Kotschy* (985); Kyrenia Pass, *Lascelles*!

Thesium divaricatum DC. Troodos, *Kotschy*.

ARISTOLOCHIACEÆ.

Aristolochia sempervirens L. Cyprus, *Lascelles*! N.B.—Boissier says *Kotschy*'s plant from Troodos (736) is *A. altissima* Desf.

EUPHORBIACEÆ.

Euphorbia Peplis L. Coast, *Post*.

E. lanata Sieb. Fields near Larnaka, *Sintenis* (894!); near Kophino, *Lascelles*!

E. Helioscopia L. Cyprus, *Sintenis*!; Ayios Paolo, *Lascelles*!

E. exigua L. Neighbourhood of Chrysostomo, *Kotschy* (400).

E. falcata L. Fields between Evrico and Morphu, *Kotschy* (950).

E. Peplus L. Larnaka, near the Salt Lake, *Kotschy* (50, 300).

E. herniariæfolia Willd. North side of the summit of Troodos, *Kotschy*.

E. amygdaloides L. Cyprus. *Sibth*.

E. Kotschyana Fenzl. Woods near Prodromo, *Kotschy* (899).

E. Characias L. Pissouri, *Lascelles*!

E. Troodii *Post*. "In cacumine Troodi Cypri," *Post*.

Andrachne telephioides L. Troodos, *Post*.

Mercurialis annua L. Cyprus, *Sibth.*, *Sintenis*!

Ricinus communis L. Cyprus, *Sibth.*; near Synkrasi, *Kotschy* (544!).

URTICACEÆ.

Urtica pilulifera L. Stony places in sheepfolds, *Kotschy*.

U. dioica L. Larnaka, in gardens, *Kotschy*.

Parietaria cretica L. Rocks on north side of Limestone. Mt., *Kotschy* (443).

SALICINEÆ.

Populus nigra L. Near Chrysoku and the Trooditissa Monastery, *Sibth*.

ARACEÆ.

Arum detruncatum C. A. Meyer. Cyprus, *Lascelles*!

ORCHIDACEÆ.

Serapias laxiflora Chaub. Between Limasol and Omodos (413); near Lefkera, *Kotschy* (234).

Aceras anthropophora R. Br. Between Ormodos and Limasol, *Kotschy* (55).

Orchis coriophora L. Nicosia and Kyrenia, *Post*. Boissier quotes the var. *fragrans* on *Kotschy*'s authority (497).

O. papilionacea L. "Government House," *Lascelles*!

O. pseudosambucina Ten. Between Omodos and Trooditissa, *Kotschy* (416).

Ophrys hiulca Sprun. Plains, *Post*.

O. tenthredinifera Willd. Near Lefkera, rarely, *Kotschy* (220a); Cyprus, *Sibth*.

O. atrata Lindley. Rarely, between Limasol and Omodos (270); near Lefkera, *Kotschy* (231).

O. Scolopax Cav. β *pecta* Link. Near Lefkera, and near Larnaka, *Kotschy* (269).

Cephalanthera grandiflora Bab. Rarely in woods of the Schwarzföhren; leaves near Prodromo, *Kotschy* (758 a).

Epipactis palustris Crantz. Marshes, *Post*.

E. veratrifolia Boiss. & Hoh. Spring above Carverena, on the new road from Troodos, *Lascelles*!

IRIDACEÆ.

Romulea Tempskyana Freyn. Cyprus, *Freyn*.

Iris Sisyrinchium L. Plains, *Post*; Cyprus, *Sibth.*; *Lascelles*!

Gladiolus segetum Gawl. Cyprus, *Sintenis*! At the foot of Sta. Croce, *Sibth.*, 1787.

MELANTHACEÆ.

Colchicum Bertolonii Stev. Sandy ground near Famagusta, *Kotschy* (179); Nicosia, *Post*; Cyprus, *Lascelles*!

LILIACEÆ.

Fritillaria libanotica Boiss. Citium, *Post*.

Tulipa montana Lindl. Near Panteleimon, on the way to Paleo Milo, *Kotschy*.

Ornithogalum pyrenaicum L. West of Prodromo (910); near Ivatli, *Kotschy* (528!). *Diptera*, *Lascelles*!

Scilla autumnalis L. Near Paphos, *Kotschy* (56); *Lascelles*!

Allium rotundum L. Cyprus, *Sibth.*; Pissouri, *Post*.

A. sphærocephalum L. Mountains above Kikko, *Post*.

A. hirsutum Zucc. Mountains near Prodromo (768); near Maschera, *Kotschy* (242); Limasol, *Post*. (*Kotschy's* no. 528 is *A. trifoliatum* Cyr.)

A. neapolitanum Cyril. Near Larnaka (304); foot of Buffavento (412); Trinithia (481); *Kotschy*. Nisso, *Post*.

Muscari Pinardi Boiss. Fields, *Post*.

M. parviflorum Desf. Limasol, *Post*.

**Bellevalia Millingeni* *Post*. Near Nicosia, *Post*.

Asparagus aphyllus L. Near Larnaka (1); between Moni and Amathus, *Kotschy* (578).

A. verticillatus L. Environs of Larnaka, and near Haggi Napa, *Kotschy* (381).

Ruscus aculeatus L. var. *angustifolius*. Hedges round Platres, *Lascelles*!

SMILACEÆ.

Smilax aspera L. var. *mauritanica* Desf. Cyprus, *Lascelles*!

JUNCACEÆ.

Juncus maritimus Lam. Near Larnaka, in brackish water, *Kotschy*.

J. acutus L. Kythraea, *Sintenis* (558)!

J. bufonius L. Near Larnaka and elsewhere, *Kotschy* (63, 559 a);

near Larnaka, *J. Ball* (2436 !) as *J. pygmæus* Thuill. ; see Journ. Bot. 1905, 332.

CYPERACEÆ.

Cyperus rotundus L. Grassy places near springs in the upper gardens of Prodromo, and in the Gartenthal towards Trisedies, *Kotschy* (771).

**C. cyprius* Post. Among rocks and stones in rivers of Troodos, Post.

Scirpus Holoschænus L. Mountains, Post.

Schænus ferrugineus L. Among rocks at the base of Cape Gatto (600) ; rarely near Prodromo, *Kotschy* (890).

Carex divisa Huds. Near Colossi, on graves, *Kotschy* (620).

C. muricata L. Near Prodromo, *Kotschy* (855).

C. divulsa Good. Near Episkopi, rarely, *Kotschy* (620).

C. remota L. Near Prodromo, *Kotschy* (826).

C. glauca Scop. Near Prodromo, *Kotschy* (826 a).

C. fulva Good. North side of the Limestone Hills, *Kotschy* (494).

GRAMINEÆ.

Panicum colonum L. Nicosia, Post.

Setaria verticillata L. Near Limasol, *Kotschy* (606 a).

Imperata cylindrica L. Plains, Post.

Andropogon distachyum L. Near Melandrina, *Kotschy* (523).

A. halepensis Sibth. Between Limasol and Colossi, *Kotschy*.

A. Gryllus Trin. Stony places in Cyprus, Sibth.

Phleum asperum Vil. Fields near Episkopi, and near Kuklia, *Kotschy* (616 a).

Alopecurus pratensis L. Cyprus, Sibth.

Milium effusum L. Cyprus, Sibth.

Stipa pennata L. Cyprus, Sibth.

Polypogon monspeliensis Desf. Near Haggia Napa (107) ; near Mazoto, *Kotschy* (560).

Aira caryophyllea L. Near Prodromo, *Kotschy* (841).

Avena sterilis L. Near Larnaka, *Kotschy* (3).

A. fatua L. Cyprus, not located, Samson !

Cynodon Dactylon Pers. Limasol, *Kotschy*.

Phragmites communis Trin. Near Colossi, *Kotschy*.

Echinaria capitata Desf. Near Prodromo, *Kotschy* (833).

Lamarckia aurea Moench. Stony places near Peristeroani, Sibth. ; near Limasol, *Kotschy*.

Briza media L. Cyprus, Sibth.

Eluopus littoralis Willd. Larnaka, salt-marsh, Post. (The var. *repens* Cosson only recorded by Boissier.)

Dactylis glomerata L. Near Prodromo, *Kotschy* (877 a).

Poa compressa L. Cyprus, Sibth.

P. bulbosa L. Near Larnaka (71) ; near Machera, *Kotschy* (211).

Festuca rigida Kunth. Near Prodromo, *Kotschy* (859).

F. dura Vill. Near Peristeroani, Sibth. ; near Prodromo, *Kotschy*.

Bromus tectorum L. On conglomerate near Larnaka, *Kotschy*.

B. divaricatus Rhode. On conglomerate near Larnaka, *Kotschy*.

Brachypodium pinnatum L. Kippalunga, Post.

- Agropyron junceum* L. Sea-shore near Paphos, *Kotschy* (671 a).
Ægilops ovata L. Near Larnaka, *Kotschy* (274).
Æ. triuncialis L. South coast near Citti, *Kotschy*.
Lolium rigidum Gaud. Coast near Larnaka, *Kotschy* (262).
Psilurus nardoides Trin. Cyprus, *Sibth.*; near Prodromo, *Kotschy* (842).

GYMNOSPERMÆ.

CONIFERÆ.

- Pinus Brutia* Ten. Mountains of Kyrenia, *Post*.

GNETACEÆ.

- Ephedra campylopoda* C. A. Meyer. Plains, *Post*; near Kophino, *Lascelles*!

PTERIDOPHYTA.

FILICES.

- Ceterach officinarum* Willd. Rocks on Pentadactylon, *Kotschy* (375 a).
Adiantum Capillus-Veneris L. Below Pentadactylon (331); south side of Troodos, *Kotschy* (883); Cyprus, *Samson*!
Pteris Aquilina L. Heights of Troodos, &c., *Sibth.*
Asplenium viride Huds. In the gorges of Troodos, *Kotschy* (864).

The following should be inserted in its place (after *Onagraceæ*) on p. 308:

FICOIDEÆ.

- Telephium Imperati* L. var. *orientale* Boiss. Troodos, *Sintensis* & *Rigo* (719).

N.B.—As it is the author's wish to publish a complete list of Cyprus plants, he will be grateful for any notes that may be sent him.

A NEW CELTIS FROM TROPICAL AFRICA.

By A. B. RENDLE, M.A., D.Sc.

Celtis ugandensis. Arbor ramulis novellis superne puberulis, adultis glabris, cinerascentibus; foliis glabris, coriaceis, breviter petiolatis, lanceolatis vel anguste elliptico-lanceolatis, basi æquali angustatis, apice acuminatis, margine integro, nervo mediano, et nervis lateralibus curvato-ascendentibus 4-5, subtus valde prominentibus; stipulis caducis lineari-lanceolatis; floribus . . . fructibus immaturis ovoideis, in foliorum axillis sæpe geminis, vel interdum tribus aggregatis, pedicellos subæquantibus vel paullo longioribus; perianthio pæne ad basin diviso, segmentis 5, lanceolatis, in parte inferiore crassiusculis, superne tenuiter membranaceis; stylis 2, linearibus, indivisis.

Leaves, including petiole (6-7 mm. long), 6-10 cm. long, 1.5-2 cm. broad, acuminate tip 1-1.5 cm. long. Stipules barely 4 mm. long. The secondary nerves converge again above, running

parallel with the margin; they are joined by thin, less prominent cross unions. Young fruits about 7 mm. long, pedicels 3-5 mm., styles about 3 mm. long. Perianth 2 mm. long.

Only specimens with immature fruit were obtained.

Hab. Entebbe, March 1st, 1905; no. 669. Native name, "mbaliwali."

A well-marked plant, distinguished from the other African species by its narrow entire-margined leaves, the venation of which recalls the Angolan *C. Soyauxii* Engler, which, however, has deeply bifid styles. Of the other East African species, *C. ilicifolia* Engler (Kilimanjaro region), differs in its grossly dentate leaves and divided styles, and the more southern *C. Stuhlmannii* Engler (Uluguru), in which the styles are also divided, is densely ferruginously hairy.

In the same collection Dr. Bagshawe sends material including both male and female specimens of *Chlorophora excelsa* Benth. & Hook. f., evidently widely distributed in east as well as west tropical Africa. It is described as a tall tree, native name "mvuli," affording probably the best timber in Uganda. The specimens (no. 734) come from Entebbe, Victoria Nyanza.

OVERLOOKED PLANTS DESCRIBED BY SCHREBER.

BY JAMES BRITTEN, F.L.S.

WHILE rearranging the genus *Lysimachia* in the National Herbarium in accordance with Dr. Knuth's recent monograph, I came upon a specimen of the plant therein described as *L. anagalloides* Sm., bearing the name "*L. serpyllifolia* Schreb. Nov. Act. N. C. 4, p. 144." On looking up the reference I found that this name was there duly published with full description. Further investigation showed that the paper must have been generally overlooked, for of the six names first published therein, only one is included in the *Index Kewensis*.

The paper in question is the second instalment of one published in the *Nova Acta Physico-medica Academiae Caesareae Leopoldino-Carolinae Naturae Curiosorum*, vol. iii. 1767, pp. 473-480, entitled "Observatio XCII. Dn. D. Joann. Christian. Daniel. Schreberi, sistens Stirpium obscurarum aut novarum illustratarum Decuriam I"; the second decade (vol. iv. pp. 132-146) has a similar title, except that "minus cognitarum" is substituted for "obscurarum." The names in the first decade have been more frequently taken up than those in the second, but it has not been recognized that they often supersede, on the ground of priority, names that have been generally accepted. Certain points connected with the plants are elucidated by the National Herbarium, and I think it may be worth while to put on record a few notes on the two decades.

The dates on the title-pages of the two volumes are respectively 1767 and 1770; the parts containing Schreber's papers may have been published at an earlier date, as the first decade has at the end

“*Lipsiæ Halam missa*, d. 18. Februar. 1765,” and the second, “*Lipsia Halam missa* d. 12. Februar. 1769”; the printed dates are however sufficient to ensure for the names given the priority here claimed for them. In two cases the application of the Vienna rules has rendered new combinations necessary.

CYNOGLOSSUM RACEMOSUM (Decade I, 3).

Persoon, Lehmann, A. P. De Candolle, and authors generally, down to the *Index Kewensis*, adopt for this plant Willdenow's name *angustifolium*, with which authors are agreed it is identical. Both Schreber and Willdenow, however, base their description on Tournefort's “*Cynoglossum orientale minus, flore campanulato cæruleo*,” of which we have a specimen in the National Herbarium. The plant is now referred to *Paracaryum*, under which it must take its earliest specific name; it will stand as

PARACARYUM RACEMOSUM.

Cynoglossum racemosum Schreb. in Nov. Act. Nat. Cur. iii. 475 (1767).

C. angustifolium Willd. Sp. Pl. i. 763 (1797); Pers. Syn. i. 160 (1805); Lehmann, Asperifol. 171 (1818); Index Kewensis, &c.

Paracaryum angustifolium Boiss. Fl. Or. iv. 263 (1879).

TRIFOLIUM GRANDIFLORUM (Decade I, 5).

This name is not taken up in the *Flora Orientalis* and is retained as distinct in *Index Kewensis*. It is identical with the plant generally known as *T. speciosum* Willd., as noted by Dryander in the National Herbarium, where we have a specimen from Tournefort, on whose “*Trifolium creticum elegantissimum magno flore*” both Schreber and Willdenow base their descriptions. Schreber's name must of course supersede Willdenow's, as the following dates will show:

TRIFOLIUM GRANDIFLORUM Schreb. in Nov. Act. Cur. iii. 477 (1767).

T. speciosum Willd. Sp. Pl. iii. 1382 (1800) et auct.

GALIUM JUNCEUM (Decade I, 8).

This name is not taken up in the *Flora Orientalis* nor in De Candolle's *Prodromus*; in the *Index Kewensis* it is referred to *G. græcum*. Schreber was acquainted with *G. græcum*, of which he sent specimens to Linnæus, as mentioned by the latter when describing the species (Mant. 38); and he himself describes it in his second Decade (no. 8), with a reference to Linnæus but none to *G. junceum*. Figures of Prosper Alpinus are cited by Schreber for each of the species, and it seems impossible to suppose that they can be intended to represent the same plant. In the absence of any clue in the Herbarium, the identification of *G. junceum* must be left to someone well acquainted with the genus.

PHASEOLUS TRILOBATUS (Decade II, 1, tab. iv.).

Under this name Schreber places two plants usually regarded as distinct—*Dolichos trilobatus* L. (Mant. 101) (*Phaseolus trilobus* Ait. Hort. Kew. iii. 30) and *Phaseolus aconitifolius* Jacq. (Obs. iii. 2, t. 52). Linnæus's plant is based on the “*Phaseolus maderaspatensis, cauli-*

culis pilosis, scandens, passifloræ modo trilobatus" of Plukenet (Alm. 292, t. 120, f. 7 (erroneously cited as 3 by Linnæus)); followed by a note, "Sata, multoties mihi enata, florere recusavit; hinc etiam num de genere minus tutus. H[ortus] U[psaliensis]." Schreber quotes Linnæus's brief diagnosis—"Dolichos volubilis pilosus, foliolis trifidis"—in a slightly altered form, and cites Plukenet's descriptive phrase from the legend under plate 120 (where it begins "Trifolium maderaspatense") and not from the text of the *Almagestum*. We have in Herb. Sloane, xciv. 45 and xcvi. 123, Plukenet's specimens of his plant and in the general Herbarium those of Aiton's *Phaseolus trilobus*, under which, as also in Solander's MSS., was included *Dolichos trilobus* L., whence the name was transferred. That, however, was placed in *Pachyrhizus* by Richard when establishing that genus, and is referred in *Index Kewensis* to *P. angulatus*.

Schreber, however, also includes under *P. trilobatus*, *P. aconitifolius* Jacq., and his figure represents that plant. Jacquin based his species on "Phaseolus maderaspatensis Aconiti folio. Petiv. hort. sicc. ined." Of this we have in Herb. Banks a curious old sheet from Gronovius's herbarium bearing on the front the Jacquin and Petiverian name and "D. Amman ex Anglia 1731" and endorsed by Dryander with the Jacquin name in the manner in which he was accustomed to write up types; this is the specimen referred to in Ait. Hort. Kew. ed. 2, iv. 290.

It seems clear that Schreber's name must be adopted, as it is not only the oldest trivial but the earliest combination under the genus. The two species, so far as the present note is concerned, will stand—

PHASEOLUS TRILOBATUS Schreb. in Nov. Act. Nat. Cur. iv. 132 (1770)
excl. syn. Jacq. et ic.

Dolichos trilobatus Linn. Mant. 101 (1767)!

Phaseolus trilobus Ait. Hort. Kew. iii. 30 (1789)! excl. syn.;
Fl. Brit. Ind. ii. 201.

PHASEOLUS ACONITIFOLIUS Jacq. Obs. iii. 2, t. 52 (1768).

P. trilobatus Schreb. l. c. ex parte (*i. e.* quoad syn. Jacq. et ic.).

ÆSCHYNOMENE ACULEATA (Decade II, 2), tab. v. fig. 1.

This is the plant usually known as *Sesbania aculeata* Pers., and it is only on account of this overlooked name of Schreber that that species can retain its commonly accepted specific name, as the earliest trivial, apart from this, seems to be *Æschynomene bispinosa* Jacq. Ic. iii. 13 (1786). Apart from Schreber, the first publication of *aculeata* was by Willdenow (Sp. Plant. iii. 1147) in 1800.

In the *Index Kewensis* the authority for *S. aculeata* is given as Poir. Encycl. vii. 128. But Poiret employed throughout the spelling of the name, *Sesban*, employed by Adanson when founding the genus; and it is difficult to see on what ground this can be rejected. It is not ruled out by any decision of the Vienna Congress and it is not in the list of "nomina rejicienda" appended to its Report. Rather would it seem to have received express sanction, for Art. 24 says that "generic names may be taken from any source

whatever and may even be composed in an absolutely arbitrary manner," and *Liquidambar* and *Manihot* are given as examples; while Art. 57 states that "the original spelling of a name must be retained, except in case of a typographic or orthographic error." Such names as *Sesbania*, *Cajanus*, and *Canavalia* must therefore revert to their originals—*Sesban*, *Cajan*, and *Canavali*.

CLEOME VIRIDIFLORA (Decade II, 3, tab. iii.).

This is *C. gigantea* L. Mant. 430 (1771), and if the date 1770 is to be accepted antedates that name.

SAPONARIA GRÆCA (Decade II, 3, tab. v. fig. 2).

Mr. Williams concurs in the opinion that this is identical with *S. hirsuta* Labill. Schreber based it on "*Alsine orientalis fruticosa saxatilis foliis et floribus aggregatis*" of Tournefort, and we have a specimen from Tournefort, not named by him, which has been referred in the Herbarium to *S. hirsuta*. The plant is now generally referred to *Gypsophila*, under which it will have to take *græca* as the oldest specific name. The synonymy is:—

GYPSOPHILA GRÆCA.

Saponaria græca Schreb. in Nov. Act. Nat. Cur. iv. 138, t. v. fig. 2 (1770) non Boiss.

Saponaria hirsuta Labill. Ic. Pl. Syr. iv. 9, t. iv. fig. 2 (1812).

Gypsophila hirsuta Spreng. Syst. ii. 373 (1825) et auct.

Schreber's name is included neither in the *Index Kewensis* nor the *Flora Orientalis*; in the latter work Boissier names a new species *Saponaria græca*.

GYPSOPHILA LARICINA (Decade II, 5).

This name, which has fallen entirely out of notice, neither Mr. Williams nor myself is able to identify.

LYSIMACHIA SERPYLLIFOLIA (Decade II, 10).

This is based on "*Anagallis cretica vulgari simillima, flore luteo* Tourn. Cor. 7." Of this we have specimens from Tournefort with the descriptive phrase attached, correctly identified with *L. anagalloides* Sibth. and Sm. (Fl. Græcæ Prodr. i. 130), where Tournefort's phrase is cited as a synonym. We have also specimens from Sibthorp from Crete, and the identity of the two is unmistakable. The name therefore stands:—

LYSIMACHIA SERPYLLIFOLIA Schreb. in Nov. Act. Nat. Cur. iv. 144 (1770).

L. anagalloides Sibth. & Sm. Fl. Græcæ Prodr. i. 130 (1806); Fl. Græca, ii. 74, t. 190 (1813); Knuth, Primulacæ, 263 (Das Pflanzenreich, iv. 237, 1905) et auct.

The following note upon a Tournefortian plant may be added here:—

ONOSMA TENUIFLORA Willd.

This stands in the *Index Kewensis*, following A. P. De Candolle (DC. Prodr. x. 65) and Boissier (Fl. Or. iv. 191), as a synonym of

O. rupestre M. B.—a reduction first made by Lehmann (*Asperifolia*, ii. 370), where the name is misprinted *tenuifolium*. It will be clear, however, from the appended bibliography that Willdenow's name must be maintained, if the two plants are, as is generally agreed, synonymous. Bentham (*l.c.*), quoting Willdenow's name, adds "excl. ex Lehm. Syn. Tourn."; I can find no definite exclusion in Lehmann of Tournefort's synonym, although it is true he does not specifically cite it. Willdenow, however, took his name *tenuiflora* from Tournefort's descriptive phrase "*Symphytum orientale echii folio, flore albo tenuissimo*," and a specimen from Tournefort in the National Herbarium, so named by him, agrees with the description and with other specimens of *O. rupestre*.

The name stands:—

ONOSMA TENUIFLORA Willd. Sp. Pl. i. 775 (1797); Pers. Syn. i. 162 (1805).

O. rupestre M. Bieb. Fl. Taur.-Caucas. i. 132 (1808) (*rupestris*); Lehm. Asperifol. 370 (1818); A. P. De Candolle, Prodr. x. 64 (1846); Boissier, Fl. Or. iv. 191 (1879); Index Kewensis, ii. 351 (1894).

It would seem that Willdenow had but small fragments of Tournefort's specimens in his herbarium; Lehmann (*l.c.*) speaks of the "frustulis" he had seen there of *O. tenuiflorum* and Boissier (Fl. Or. iv. 264) says of *Paracaryum glastifolium* (*Cynoglossum glastifolium* Willd. Sp. Pl. i. 764), "Vid. frustul. in Willd. herb." Of this latter we have in the National Herbarium a good specimen from Tournefort with his descriptive label: "Armenia (Tournef.);" is the only locality given in Fl. Or.

HISTORY OF PLANT CLASSIFICATION.

THERE is at present on view in the public gallery of the Department of Botany at the Natural History Museum an interesting exhibition of books and portraits illustrating "the chief epochs in the development of a natural system of plant classification; that is to say, a system which shows the actual relationship of plants as contrasted with an artificial system which is based on the differences presented by one set of organs." To accompany the exhibition a Guide has been prepared by Dr. Rendle, from whose preface the foregoing sentence is quoted; it consists of the labels connected with the exhibition expanded into a useful little account of the principal stages in the development of the subject, with short biographical notices of the writers of the books shown.

The authors whose works are selected for exhibition include Otto Brunfels (c. 1488–1534) whose *Herbarium* contains woodcut illustrations hardly if at all inferior to the much-admired ones in Fuchs's *New Kreüterbuch* of a few years later; William Turner (c. 1512–1568) the illustrations of whose *Herbal* are greatly inferior to those just mentioned; John Gerard (1545–1612) who, following



ROBERT BROWN

L'Obel, based his groups on well-marked characters of general form, manner of growth, and economic use, neglecting those afforded by fruit and seed; Cesalpino (1519-1603) who recognized the importance of characters derived from the fruit, seed and embryo; Robert Morison (1620-1683) whose work on *Umbelliferæ* is shown as the first systematic monograph of a limited group; John Ray (1627-1705), who "by his recognition of the importance of the character of the embryo and the presence of one or two cotyledons inaugurated a natural system of classification"; Tournefort (1656-1708), whose classification was artificial, but who accurately defined genera; Linnæus (1707-1778), the inventor of binominal nomenclature and co-ordinator of all plants then known; Adanson (1727-1806), whose genera for some reason not easily ascertainable have until lately been largely ignored; A. L. de Jussieu (1748-1836) who, with his uncle Bernard largely developed the Natural System; A. P. de Candolle (1778-1841) whose *Prodromus* was "perhaps the most important factor in the development and general adoption of the Natural System"; Robert Brown (1773-1858), the first Keeper of the National Herbarium, who "by his investigation of difficult points in the morphology of the flower and seed and his critical work on affinities ranks high as an exponent of the Natural System"; Stephan Endlicher (1804-1849), whose system shows an advance in the treatment of Cryptogams; Wilhelm Hofmeister (1824-1877), whose work supplied the basis for the distinction of the great plant groups—Thallophytes, Bryophytes, Pteridophytes, Gymnosperms and Angiosperms; George Bentham (1800-1884) who, with Sir Joseph Hooker, born in 1817 and happily still with us, elaborated the *Genera Plantarum*; and Prof. Engler, whose *Syllabus* represents the latest and most generally accepted view of plant classification.

Apart from the exhibition, the Guide has a permanent interest, which is increased by four illustrations—portraits of Ray, Linnæus, and Brown and a reproduction of Ehret's plate illustrating the twenty-four classes of the sexual system, the original drawing for which is exhibited. The Guide, which can only be obtained at the Natural History Museum, Cromwell Road, costs 4d., by post 5d. By the courtesy of the Museum authorities we are enabled to reproduce the portrait of Brown.

OPHRYS × HYBRIDA.

THERE have recently been placed on view in the Botanical Gallery at the Natural History Museum specimens of *Ophrys* × *hybrida*, a presumed natural hybrid between *O. aranifera* and *O. muscifera*. Specimens of the hybrid and of the two parents were sent by Mr. W. R. Jeffrey from Wye Downs, Kent, where, as recorded in the *Orchid Review* for 1905 (p. 233), the hybrid was discovered about the end of May last year. An account of this new British orchid was given by Mr. R. A. Rolfe in the journal mentioned,

along with a figure, which he has kindly lent for reproduction here. The plant was originally named by Pokorny, who recognized its hybrid character, and described and figured by Reichenbach (Fl. Germ. xiii. and xiv. 79, t. 465).



Enlarged coloured drawings of the flowers placed alongside the specimens of the hybrid and its parents show well the intermediate character of the former. The petals are narrower than in the Spider, but broader and less antenna-like than in the Fly; the lip is in length and breadth comparable to that of the Spider, but approaches the Fly in having lateral lobes, though these are shorter

than in the latter; the apex is also more deeply indented than in the Spider. The ground colour of the lip (a warm reddish brown) is also intermediate, while the disc bears a strong metallic lustre almost as brilliant as in the Fly.

As the plants were growing in the vicinity of the two recognized species, there seems no reason to doubt their hybrid origin. In a more recent note in the *Orchid Review* (August, 1906), Mr. Rolfe refers to other hybrids between species of *Ophrys* which have been recorded as found in Kent.

In the figure, *Ophrys muscifera* is represented on the right, *O. aranifera* on the left, and the hybrid between.

A. B. R.

BOTANICAL EXCHANGE CLUB REPORT, 1905.

[THE Report of the Exchange Club for 1905 (issued in April last) by Mr. J. Walter White, "Editor and Distributor," is, like that for 1904, preceded by the "Secretary's Report" in the form of a letter—it concludes "with all best wishes, I am, yours very sincerely, G. Claridge Druce"—in which are mentioned some of the "chief items of botanical interest of the year 1904"—a misprint for 1905. We have never quite understood the reason for this innovation, but if, as is probable, it is intended for the benefit of those botanists who do not see other botanical literature, it is difficult to understand why Mr. Bennett's *Second Supplement to 'Topographical Botany'* finds no place.

In accordance with our usual practice, we extract a few of the more interesting notes, omitting those relating to *Rubus*, *Rosa*, *Hieracium*, *Mentha*, and *Euphrasia*, for which reference must be made to the Report. It is pleasant to notice that the energy of the members of the Club shows no diminution, and that "among later recruits" are "such adepts as Mr. Spencer Bickham and Dr. Vigurs, whose admirable parcels deserve mention." Mr. Bickham was many years ago well known among British botanists, and his return to their ranks is a matter of gratification.

We note the continued tendency to add to the number of varieties recorded for Britain, and still feel that these are often increased on insufficient grounds, and that new names are somewhat hastily imposed and even (see *Cratægus*) published without indication that they are new. We cannot but feel that to publish new names or descriptions of novelties in a Report of a Club shows a want of consideration which is the more to be regretted inasmuch as there are numerous botanical journals in which they would be generally accessible. The note under *Urtica dioica* shows the trouble which such names give, and the difficulty, or even impossibility, of running them to earth when they are once started.

The Rev. W. R. Linton, Shirley Vicarage, Derby, will be the distributor and editor for 1906.—ED. JOURN. BOT.]

THALICTRUM MINUS L. var. = T. COLLINUM Wallr. var. CALCAREUM Jord. Newmarket Heath, Cambridge, Aug. 1905. In the *Lond.*

Cat. this is given as occurring in Ireland only, but the authors of *Cybele Hibernica* do not venture to separate *calcareum* from *collinum*; while Hind, in *Fl. Suffolk*, places the Newmarket plant under *T. minus* as var. *montanum* Wallr., which he considers as synonymous with *T. flexuosum* Bernh., a name which precedes that of *collinum* of Wallroth, although there may be a point as to the *Cat. Hort. Erf.* (1815), where *T. flexuosum* was published by Bernhardt, being a valid publication. In Babington's *Manual*, *T. collinum* is put as a variety of *T. majus* Sm. The late Herr Freyn was disposed to consider this plant as *T. calcareum* Jord., but he did not live to see the more complete specimens I sent him. At Newmarket, on the chalk, this plant is abundant. It varies much in size; in exposed places it is dwarfed to a few inches, while in sheltered and damp spots it reaches a height of two or three feet.—G. CLARIDGE DRUCE. "I have cultivated this plant for some years. I prepared a series and submitted them to the late Herr Maximowicz, and to Dr. Schumann, but they both hesitated to give a name. I think it is nearest *T. montanum* Wallr. var. γ *glandulosum* Wallr. *Sch. Crit.* 255, 1822."—AR. BENNETT.

T. KOCHII Fr. Riverside, Langdale, Westmoreland, July, 1905. Abundant in Great Langdale, from Dungeon Ghyll to Skelwith Bridge, Westmoreland: occurring also in Lake Lancashire. The characters all point to this being the real plant of Fries; the fruits, although insect-swollen, show the ovoid outline well.—AUGUSTIN LEY.

RANUNCULUS FLAMMULA L. forma. A completely prostrate, but not rooting form. Growing on damp spots at Gerrard's Cross Common, Bucks, July, 1905.—G. C. DRUCE. "There is a root on one of the specimens, and the beginning of nodal-rooting is evident on two or three others."—ED. "In all the specimens seen by me the plant tends to be nodal-rooting near the base of the stem. One of the innumerable states of the type, in my opinion."—E. S. MARSHALL.

R. FICARIA L. var. *INCUMBENS* Schultz. On the margin of damp coppice in Ashton Park, North Somerset, April 8th, 1905. This variety is rather rare about Bristol, and seems to be confined to damp, shaded situations, where the plants are luxuriant. The amount of fruit produced by the aggregate varies in different districts. An examination of about 1000 plants in the vicinity of Bristol showed that at Westbury-on-Trym only 1 in 400 was fertile: near Long Ashton the proportion was 1 in 150, and about the same at Backwell. I have been told that near Norton Malreward heads of carpels can be found "in every ditch,"—a frequency that might not, however, be greater than that I have last mentioned.—JAS. W. WHITE.

CALTHA RADICANS Forster. At the upper end of Loch Tummel, Mid Perth, July, 1905. A new county record. Some of the specimens were the nearest to Forster's plant that I have yet seen, even the radical leaves being nearly triangular in outline. I saw it also near Methuen Bog, in the same vice-co.—G. CLARIDGE

DRUCE. Also by the Couglass, near Tomintoul, Banff, vice-co. 94, July 15th, 1905.—W. A. SHOOLBRED. "Leaves more like (in the Banff gathering) var. *zetlandica* Beeby than the original form; but Mr. Beeby would now, I believe, simply call *all* nodal-rooting plants *C. radicans*, and I agree with him. Even on the same individual there is frequently considerable variation in shape and cutting of the root-leaves."—E. S. MARSHALL.

PAPAYER RHÆAS L. var. PRYORII Druce. Syston, Leicestershire, July 6th, 1905.—A. R. HORWOOD. "No doubt the form so named, but the colour in the hairs is not so apparent as in some specimens."—H. and J. GROVES. "This is the form which Mr. Druce has so distinguished, though it seems to me to glide insensibly into the form with less densely hispid peduncles, and to have a doubtful claim to varietal rank."—E. F. LINTON. "The variety is based upon the *crimson colour* of the hairs."—G. C. DRUCE.

VIOLA ODORATA L. var. FLORIBUNDA Jord. Cobham, Kent, March, 1905. Coll. E. W. Hunnybun. Verified by comparison with Jordan's type * at the British Museum.—E. S. GREGORY.

V. ODORATA L. var. SULFUREA Cariot. The Lodge Wood, Weston-super-Mare, April 5th, 1905. Petals yellow in their lower two-thirds, yellowish white above, faintly scented. The two lateral petals are slightly bearded (*sulfurea* should have no beard), spur violet, capsule densely pubescent.—E. S. GREGORY.

V. RIVINIANA Reichb. forma MINOR. Hillside near Weston-super-Mare, May 17th, 1905. Named by Prof. Murbeck. I have examined the violets at Kew and the British Museum, and find that this plant figures chiefly as *V. flavicornis* Sm. of *canina*.† It may be the form *V. flavicornis* Forster of *Riviniana*, but of this I can find no examples in our public herbaria. The following description shows its decided affinity with *V. Riviniana*:—Plant dwarf with rosette of leaves, secondary flowering-branch not usually developed; flowers few (often only one to a full-grown plant). Leaves roundish-cordate, very small, shining and dark-hued below. Peduncle long, flowers large—mauve splashed with white—veining and spur of *Riviniana*. The anther-spurs are likewise as in *Riviniana*, and quite unlike those of *canina*.—E. S. GREGORY. "This should certainly equal *V. flavicornis* Forster, but Mrs. Gregory's note shows—what I have learnt from her personally—that she does not attach so much importance to characters derived from the flowering and lengthening of primary and lateral stems as did the older botanists."—ED.

V. CANINA L. var. Dry river-bed, Clogher, Co. Tyrone, May, 1905, coll. Miss Peck. Has the habit of *Riviniana* with a central rosette of leaves. It is, however, more fleshy, and there are suggestions of *canina*, especially as regards the anther-spurs. Prof.

* [It would be more accurate to say "a specimen authenticated by Jordan." ED. JOURN. BOT.]

† [The specimens labelled *V. flavicornis* Forst. in Sowerby's Herbarium were not used in the preparation of E. Bot. Supp. t. 2736: see Mr. Garry's *Notes on Drawings for 'English Botany,'* p. 27.—ED. JOURN. BOT.]

Murbeck writes of this plant:—"Dec. 14th, 1905. *V. canina* L., forme qui se rapproche un peu de la variété *crassifolia* Grönvall."—E. S. GREGORY.

V. NEMORALIS Kützing, *V. KUTZINGIANA* Rouy et Foucaud. Woodwalton Fen, Huntingdon, May 30th, 1905. Verified by comparing with Kützing's type in Herb. Brit. Museum.*—E. S. GREGORY.

VIOLA —? Wood on the North Downs, west of Wrotham, West Kent, alt. 700 ft., June 4th, 1905. This pansy grew thickly over a small area in a clearing, and presented a magnificent sight. The great bulk of the flowers were purple-violet, with the lateral and lower petals dark blue-purple and the upper petals reddish purple. There was no cultivated land in the vicinity.—C. E. BRITTON. "This seems to me identical with Mr. Wheldon's plant from Simmons-Wood, Lancs., which has been named *V. carpatica* Borb. in a former report (1901)."—E. F. LINTON.

CERASTIUM PUMILUM Curt. Near Woodstock on limestone, and on calcareous soil near Stonesfield, Oxfordshire, April, 1905. An interesting addition to the county flora which I predicted would be found.—G. CLARIDGE DRUCE.

GERANIUM ROBERTIANUM L. var. *MODESTUM* Jord. East Pentire, Newquay, May 18th, 1905. In the *Report of the Watson Exchange Club for 1904*, the Distributor says that specimens sent as this plant from Padstow by F. H. Davey are not *modestum*. I think that must be an error, as Davey knows the plant, and it is distinguished at a glance from the type. Mr. Clement Reid has worked up some of our Newquay plants at the British Museum, so I feel sure that what I now send is the true plant.—C. C. VIGURS. "The named variations of *G. Robertianum* in their extreme forms are doubtless distinct enough to be readily recognized. This plant, however, is an intermediate. It does not agree with the description of Jordan's *modestum* given by Boreau, in that its flowers are too large, and that the lower peduncles exceed the leaves."—ED. "I agree."—C. BUCKNALL. "I am of the same opinion; but do not know *modestum* well."—EDW. S. MARSHALL.

ULEX GALLII Planch. var. *HUMILIS* Planch. Gwennap, West Cornwall, v.-c. 1, Oct. 2nd, 1905, coll. F. H. Davey, sent by C. C. Vigurs; and Fraddon Down, St. Enoder, East Cornwall, v.-c. 2, Oct. 20th, 1905, coll. C. C. Vigurs. This constitutes almost a new British record to Mr. Davey's credit, there being, I understand, only one previous one many years ago; at all events it is a record for v.-c. 1, and mine is one for v.-c. 2. This is probably the plant recorded from the Cornish mainland many times as *U. nanus* Forster by Hind, Watson, and others—(vide Davey's *Tentative List of Cornish Plants*). It is described by Planchon in *Annales des Sciences Naturelles*, April, 1849, p. 213, thus: "Var. β *humilis*, depressed, branches humifuse, branchlets and leaves crowded, flowers a little

* [There is some mistake here; Kützing's type is not in Herb. Mus. Brit.—ED. JOURN. BOT.]

smaller than in the typical race." * The plant was named by Mr. A. Bennett for Mr. Davey. It is probably very common in Cornwall on exposed downs. The procumbent branches are best seen the year after a piece of furze has been burnt, all the young shoots being humifuse; the specimens from Fraddon Down are all of this kind. The old bushes have very densely crowded branches. Mr. Davey's beautiful specimens give an excellent idea of the plant.—C. C. VIGURS.

TRIFOLIUM RESUPINATUM L. Roadside, Clifton Down, Bristol, July, 1904. Many years ago the occurrence of this plant in a field between Bristol and the Severn, whence it speedily disappeared, was noted in several botanical works of the day, and in fact received a great deal more attention than it deserved. For the species is of course alien—an introduction with cereals, seeds, or foreign forage. As such, a plant or two from time to time has been noticed about Bristol—at St. Philip's, Conham, and Portishead Dock. But at the above date an unusual quantity appeared upon our downs. Mr. C. Wall drew my attention to nine or ten patches among the turf along a roadside, and I found another at a considerable distance from any path. This curious invasion was, I suppose, due to the scattering of undigested seeds from horse droppings. The next summer but a very small quantity was observed, and that quite as likely to be of fresh introduction as to have arisen from plants of the previous year.—JAS. W. WHITE.

ASTRAGALUS DANICUS Retz. Near Burford, Oxon, June, 1905. I was quite afraid the plant was extinct in Oxfordshire, as Baxter's locality for it had been destroyed, and it was doubtful if the one mentioned by Lightfoot on Burford Downs (which are now enclosed and under tillage) was really in the county. Lady Margaret Watney, while motoring along the road from Burford to Cirencester, saw this plant by the roadside on the Gloucestershire side, and eventually found it within the Oxford boundary, whence these specimens came.—G. CLARIDGE DRUCE.

POTENTILLA SILVESTRIS Neck. (*P. TORMENTILLA* Sibth.) var. *SCIAPHILA* Zim. Wheal Cifford Down, Gwennap, West Cornwall, Oct. 14th, 1905, F. H. Davey and C. C. Vigurs, and Fraddon Down, St. Enoder, East Cornwall, Oct. 20th, 1905. An interesting plant, named by Mr. Ar. Bennett. It appears to have been only previously found on "some heathy hills of the rolled pebbles of the Thanet sands." The radical leaves are small, nearly orbicular, of three or four broadly wedge-shaped leaflets, and the whole plant is more compact than the type.—C. C. VIGURS.

CRATÆGUS OXYACANTHA L. var. *SPLENDENS*. Near Akeley, Bucks, September, 1904, and May, 1905. Distinguished from *C. Oxyacantha* by the much larger fruit, and by the more wedge-shaped leaves, which are of a pale yellowish green. It is a one-styled plant, showing no evidence of the presence of *C. oxyacanthoides*, and

* ["Var. β *humilis*, depressa, ramis humifusis, ramulis foliisque confertis, abbreviatis; floribus quam in stirpe typica paulo minoribus."—Ann. Sci. Nat. 3 Sér. xi. 213.]

therefore cannot be referred to *C. oxyacanthoides* var. *macrocarpa* Heg. Unfortunately the late frosts this year nipped the young foliage and flowers, so that the May specimens are not good or characteristic. Description:—Leaves glabrous, yellowish green, rather large, often with subentire sides, and cut at the top into three or more shallowish-lobed segments. In the younger and upper leaves the serratures are more numerous and approximate more closely to the type. The veins of the leaves are not conspicuously recurved, and in some of the older and lower leaves, which are more entire, they may be even slightly incurved. The leaves of the young shoots have distinctly recurved venation. The calyx is hairy in the flowering stage, but becomes nearly glabrous in the fruiting condition. The flowers are not conspicuously larger than the type. They are one-styled, and the style is erect, or nearly so. The fruit is twice the size of that of the normal hawthorn, and the enlargement takes place after the fruit has begun to change colour; they are one-stoned. The variety grows as a small tree about fifteen feet high, and is less thorny than usual. The conspicuous fruit induced the hedger to allow it to grow, while the rest of the hedge has been layered.”—G. CLARIDGE DRUCE. “I do not know this. Mr. Druce does not say ‘mihi,’ but I presume so.”—AR. BENNETT.

C. OXYACANTHA L. var. *CINERASCENS*. This monogynous plant, with large leaves of a greyish green colour, having the veins definitely recurved and small one-styled fruit, grew on the borders of Bucks, near Woodperry, Oxon, August, 1905. —G. CLARIDGE DRUCE. “I do not know this. I suppose ‘mihi’ also as with the last, but if so it should have been expressed.”—AR. BENNETT. “I can see no reason for calling this a *variety*—hardly even a *form*. No flower or fruit present on the specimen seen by me.”—EDW. S. MARSHALL. “Fruits were sent with each leaf example, but the railway officials damaged the parcel, and I am afraid gave the distributor a great deal of trouble. There is no doubt of the difference between this and other forms of *Crataegus* with which it grew.”—G. C. DRUCE.

PYROLA ROTUNDIFOLIA L. β *ARENARIA* Koch. Damp hollows in the sand-hills near Arnsdale, S. Lancs. (59), July, 1899, and near Formby, S. Lancs., August, 1905. This promises to become at an early date one of our rarest British plants. It is extinct, or very nearly so, in the Lytham district (v.-c. 60), and its area has recently been greatly reduced in S. Lancs. (v.-c. 59). Almost yearly one of the hollows in which it used to abound is found to be either built upon, or drained and converted into golf-links. There are now only one or two very limited “slacks” in which it flourishes, and which may be invaded at any time.—J. A. WHELDON.

POLYGONUM MITE Schrank. Binsey Common, Oxon; growing with *P. minus* and *P. Persicaria*, October, 1905. Not quite typical, and may possibly be a hybrid of *P. minus* with *P. Persicaria*. Some specimens of *P. minus* are also sent from the same locality.—G. C. DRUCE. “Merely a state of *mite*, and does not answer to any of the forms described by Sælan.”—AR. BENNETT.

URTICA DIOICA L. forma PARVIFOLIA. Breinton, Hereford, Aug. 31st, 1905. This appears to be a well-marked form, and to be also widely distributed. I have it from several Herefordshire stations and from Brecon of my own gathering; from Oxford through the Club under the names of "*parvifolia*" and "*microphylla*" from Mr. Druce; and from Pachbrook, Warwick, from Mr. Bromwich, under the name "*angustifolia*." I should be glad to know the correct name and authority. See *Report, B. E. C.* 1902, p. 60.—AUGUSTIN LEY. "The described forms of *U. dioica* related to Mr. Ley's plant are the following:—(1) Var. *microphylla* Hausmann, *Flora von Tirol*, vol. ii. p. 771, 1852. (2) Var. *angustifolia* Wimmer and Grab., *Flora Silesia*; see Bab. *Man.* ed. 9. This var. *angustifolia* was originally described by Fischer in 1819, *Hornem. Hort. Hafn. Suppl.* 107; *pro specie*. (3) Var. *angustifolia* Ledebour, *Flora Altaica*, 4, p. 241, 1833. (4) Also of Blytt in his *Vegetationsf. Sogne Fjorden*, 108, 1869; (he seems to have overlooked that the name had been used before). (5) Var. *atrovirens* Gren. et Godr. *Flore Fr.* vol. iii. p. 108, 1855. Probably the plant sent by Mr. Ley is No. 2."—AR. BENNETT. "See *Report B. E. C.* 1888, pp. 230, 231. I suppose the name *parvifolia* is a bantling of Mr. Druce's. In Koch, *Syn. Deutsch. und Schw. Fl.* ed. iii., Fischer's *angustifolia* is described as having 'upper leaves linear-lanceolate.' Will not the present plant do well under *microphylla* (No. 1), with 'leaves small, mostly lanceolate?'—ED. "This small-leaved, much-branched form, if constant, seems better worth distinguishing than the var. *angustifolia* as understood in this country. We have not been able to come across either specimen, figure, or full description of var. *microphylla* Hausm. In the new edition of Koch, p. 2785, the only character given is 'leaves small, mostly lanceolate.' Dr. Gürke, in *Plantæ Europææ*, ii. p. 78, quotes var. *parvifolia* Wierzb. (1858) as a synonym for var. *microphylla* Hausm. *Tir.* ii. p. 771 (1852)."—H. and J. GROVES. "The description of *microphylla* in Hausmann's *Flora* is, 'hat 2-3 mal kleinere, schmälere, an der Basis kaum herzförmige, selbst lanzettliche, lang-zugespitzte Blätter.' The specimens I sent to the Club in 1888 were, on the contrary, very dwarfed prostrate plants, and I hesitated to refer them to the above. I think these plants would come under Hausmann's variety."—G. C. DRUCE.

SCIRPUS CERNUUS Vahl var. PYGMÆUS Kunth. Fairwood Common, July, 1903, and Jersey Marine, July, 1905; both v.-c. 41. This is the only form of the species that we have in the county, so far as I know; single and double spiked heads occur side by side. The specimens distributed represent the normal local growth.—H. J. RIDDELSDELL. "The proper name for this plant appears to be *S. cernuus* Vahl var. *monostachys* Hook. fil. It is mostly submaritime, and I believe it to be quite a good variety."—EDW. S. MARSHALL.

CAREX PARADOXA Willd. In a small marsh near Denham, Bucks, but likely to be destroyed by preparations for a new railway. A new county record, but only a slight extension of its known range, May, 1905. In the young stage the panicle recalls *C.*

elongata rather than *C. paniculata*, as the scarious margins to the glumes are practically absent. Flowers earlier than *C. paniculata*.—G. CLARIDGE DRUCE. "It is remarkable how of late years the comital distribution of this *Carex* has been increased. It is now on record for eight counties in Britain."—AR. BENNETT.

C. HORNSCHUCHIANA Bab. Black Down on Mendip, N. Somerset, at 1050 ft., June 23rd, 1905.—JAS. W. WHITE. "*C. Hornschuchiana* Hoppe, which many British botanists persist in naming *C. fulva* Good., though that is almost certainly a hybrid of *Hornschuchiana* with one of the *flava-Æderi* group. One specimen on my sheet is probably a hybrid with *C. Æderi* var. *ædocarpa*."—EDW. S. MARSHALL.

SPARTINA TOWNSENDI Groves. Salt marsh between Sturt Pond (Milford) and Hurst Castle, S. Hants, Oct. 14th, 1905. In 1895 and 1896, when I previously examined this marsh in the autumn, none of this grass was visible to the best of my recollection. It now is most plentiful, and evidently is rapidly increasing. I traced it as far as Keyhaven to the north, but there it is not so abundant at present.—J. COSMO MELVILL. In some quantity by the Fever Hospital, Poole, Dorset, v.-c. 9, with *Salicornia radicans* and *Suaeda fruticosa*, Oct. 1905. I cannot find a record for Dorset in *Top. Bot.*—H. J. RIDDELSDELL. "Nor is the genus mentioned in the *Flora of Dorset*."—ED. I have no doubt a recent introduction to the Dorset coast. I did not see it near Poole when I carefully worked the coast some years ago.—G. C. DRUCE.

ALOPECURUS GENICULATUS L. forma. In Brading salt marshes, Isle of Wight, Sept. 1905.—G. CLARIDGE DRUCE. "The normal form."—Dr. HACKEL.

A. HYBRIDUS Wimmer. Banks of the Soar, Belgrave, Leicestershire, July, 1905. The plants now distributed come from the third known locality in this county, and exhibit a closer relationship with *A. pratensis* than to *A. geniculatus*. The converse is seen in specimens recently sent to the Club from Birstall, Leicestershire, by Mr. A. B. JACKSON.—A. R. HORWOOD. See *Reports B. E. C.* 1900, p. 650, and 1902, p. 61.—ED. "From the habit and narrowness of the inflorescence I think that this is probably (as suggested) *A. geniculatus* × *pratensis*."—EDW. S. MARSHALL.

AGROSTIS PALUSTRIS Huds. forma. Roadside, near Shirley, Derby, August, 1905. If rightly named, this plant departs from the type in the somewhat open panicle, which remained open till, in October, the roadman cleaned all away. The ligule also did not appear to be exactly acute, as according to the books it should have been. Possibly a form of *nigra*, but the lower panicle branches are compound, and the colour pinkish, not "blackish brown."—W. R. LINTON. "*Agrostis alba* L. *Sp. Pl.* i. 63, 1753. *A. palustris* Huds. *Fl. Angl.* i. 27, 1762. I have no specimens to compare, but this plant seems in the direction of var. *limosa* Asch. & Graeb. *Syn. Fl. Mit. Europ.* 174, 1889."—AR. BENNETT. "No peculiar form."—E. HACKEL.

GLYCERIA FESTUCÆFORMIS Heynh. Stony sea-shore, Craigaveagh, Strangford Lough, County Down, July 10th, 1905.—R. LLOYD PRAEGER. "An excellent series of good specimens, but the plant seems merely to be a strong form of *G. maritima* M. & K. See *Report B. E. C.* 1904."—ED.

G. DISTANS Wahl. Entrance to grass-field on stiff clay, Coleman Road, Leicester, June, 1905. This maritime grass has previously been recorded for Leicestershire, but so far as is known that county is the only one that hitherto has afforded inland stations for the species. Babington records the var. *obtusa* from Leicestershire, but these specimens are pronounced by Prof. Hackel to be the type. The plant has taken good hold of a portion of a field at the side of a little-used cart-road just outside Leicester, completely covering an area of twenty or more square yards. How originally it became introduced there is unknown.—A. R. HORWOOD.

FESTUCA ELATIOR × LOLIUM PERENNE. Meadow, Sellack, Herefordshire, June 23rd, 1905. In the same meadow occurs abundant *Festuca pratensis* Huds., and depauperate forms of the same, running down to simple spikes, as well as abundant *Lolium perenne*. The present plant is markedly different from all those. It occupies a damp corner of the meadow, in which it has apparently spread from a single clump, and is certainly increasing rapidly. Unfortunately I was unable to watch if it produced perfect seeds, as I went from home, and on my return found the plant all mown down for hay.—AUGUSTIN LEY. "Correctly named."—E. HACKEL.

BROMUS UNIOLOIDES H. B. K. This grass, a native of parts of Central and South America, has in recent years begun to invade many areas in the temperate regions. I believe I was the first to gather it in the United States as a weed near the Battery, Charleston, South Carolina, in 1872. As an alien it has been met with in many parts of Great Britain, and has several times been sent to the Club. It has not hitherto been recorded for Salop, but both in 1904 and 1905 I noticed it in some abundance both on cultivated ground and in shrubberies at Meole Brace.—J. COSMO MELVILL. "Yes, an alien of increasing frequency, now yearly to be seen about the docks and railways at Bristol."—ED.

SHORT NOTES.

COTONEASTER MICROPHYLLA Wall.—This plant, the naturalization of which in Glamorganshire was recorded in this Journal last year (pp. 244, 274), is evidently becoming established. The *Kew Bulletin* (no. 6, p. 231) states that specimens have been received at Kew from the chalk downs near Ventnor, communicated by Mr. F. R. Armitage, and from Radborough [Rodborough] Common near Stroud, sent by Mr. A. D. Annesley. It is recorded from Brean Down, Somerset, by Mr. S. T. Dunn in his *Alien Flora*, whence it was received at Kew in 1892.

MATRICARIA DISCOIDEA DC. IN HANTS. — A plant new to the county grows abundantly on the roadside waste above Shide Mill, at the foot of Pan Down, near Newport, Isle of Wight, for at least one hundred and fifty yards. How long the plant has existed there I am not able to say. I had not observed it until this summer, but very probably I had overlooked it in previous years, deeming it a rayless state of *M. inodora*. I am not able to suggest any source from which the seeds may have come, other than the nearness of the locality to the mill (a flour mill) at Shide. The plant has, from its mode of growth, the appearance of having lost its centre shoot, but this arises from its habit of perfecting the central floret some time before those of the side branches, a habit which it shares with other plants which form level-topped inflorescence.—FREDERIC STRATTON.

RUBI OF DENT VALLEY, MID-WEST YORKS (v.-c. 64). — The Rubi of this narrow valley along the River Dee, for ten or twelve miles from Cowgill to Sedbergh, are of rather exceptional interest, as a week's stay at Dent last August enabled me to discover. For more than half the distance from Cowgill northward the bushes are exceedingly few and far between, and are nearly all of one species, *R. dasiphyllus*. But near the river below Dent, and on the steeply rising ground above that "town" towards the Westmoreland border, several other forms occur. The really good bramble ground of the district, however (so far as I was able to examine), extends for three miles or more at the northern end of the valley, up to the town of Sedbergh; and here, in handsome thickets on both sides of the broad road, occur all the forms in the following list for which no special locality is given. In the case of records for v.-c. 64 an asterisk is prefixed:—*R. idæus* Linn.—*R. incurvatus* Bab. A luxuriant form connecting the more prickly Derbyshire plant with the North Wales type.—**R. Bakeri* F. A. Lees, forma. — **R. nemoralis* P. J. Muell. Near the river below Dent (in one spot).—*R. pulcherrimus* Neum.—*R. Lindebergii* P. J. Muell. Hill above Dent.—*R. Selmeri* Lindeb. Exceptionally luxuriant and handsome-flowered.—*R. robustus* P. J. Muell.—*R. macrophyllus* Wh. & N. sp. coll. Hillside.—**R. hypoleucus* Lefv. & Muell. Hillside.—*R. pyramidalis* Kalt.—*R. leucostachys* Sm. Hillside.—*R. infestus* Weihe. Valley and hill. The usual very strongly armed form of North England, with tall suberect stem. With it, near Sedbergh, occurred a handsome hybrid (apparently *R. infestus* × *robustus*).—*R. Drejeri* G. Jensen.—*R. dasiphyllus* Rogers. The only common glandular bramble.—*R. sublustris* Lees. Near top of hill.—*R. cyclophyllus* Lindeb. Below Dent; a thicket or two apparently belonging to this, but not characteristic.—*R. cæsius* Linn. In great quantity by the river. As the form of *R. Bakeri*, included in the above list, is strongly marked and rather widely spread in North-west England, the following note about it may be of interest:—*R. Bakeri* F. A. Lees forma *elongata*. Differs from type in not being conspicuously dwarf (though it has the neat small leaflets so characteristic of this subspecies); in the taller, laxer, and more pyramidal panicle, with large white flowers; and, as a

rule, in the much longer petiolule of the terminal leaflet (two-thirds to four-fifths the length of the leaflet instead of about half). In its elongate, strongly-armed panicle it is intermediate between Dr. Lees's weaker form (as represented by Gormire specimens in my herbarium, and as described in the Bot. Rec. Club Report, 1884-86, 120) and the usual south country plant on which the description in my Handbook is chiefly based. In its prickles I find *R. Bakeri* exceedingly variable. In this form they are exceptionally strong and straight on both stem and panicle. *Mid-west Yorks*:—Between Sedbergh and Dent, 1906; Settle and Giggleswick, 1890. *North-west Yorks*:—By River Ure at Aysgarth and neighbourhood, 1890. *South Lancs.*:—Coniston to Ambleside; A. Ley and W. R. Linton, 1905. Last year I wrongly referred dried specimens of the South Lancs. plant to *R. Scheutzii* Lindeb. But this summer I have seen both brambles growing in plenty, and I am convinced that they keep distinct in habit, panicle, and colour of petals, as well as in the very different leaves. These in *R. Scheutzii* are greener and normally unfelted beneath, while the comparatively large terminal leaflet has a much shorter petiolule, and is much more strictly sub-rotund in outline.—W. MOYLE ROGERS.

VERONICA PEREGRINA L. IN CORNWALL.—This transatlantic species is the latest addition to the flora of Cornwall. When bramble-hunting at Killiow, two miles south of Truro, on August 4th, I saw thousands of plants. They had invaded the flower, fruit, and vegetable gardens, and were abundant by the sides of paths and wherever there was a waste corner. The gardener told me two crops are destroyed every year by hoeing, and yet the plant has gone on increasing until it now outnumbers *V. arvensis*, *V. agrestis*, and *V. Tournefortii*.—FRED. HAMILTON DAVEY.

CARMARTHEN PLANTS.—Mr. T. W. Barker has prepared a useful *Handbook of the Natural History of Carmarthenshire* (Carmarthen: Spurrell & Son), which contains a list of plants compiled by the author from *Topographical Botany* and the Supplement, aided by Dr. Jones's list of Carmarthenshire plants; he also received much help from Mr. Knight, of Llandovery. The List includes 831 species, according to the enumeration of the *London Catalogue*: of these he has seen 748 growing in the county; habitats are given for the rarer species. The most interesting species is *Liparis Loeselii*, which was brought to the author to name in 1897. This year Mr. Knight has found it in another part of the same neighbourhood, and has sent me specimens which exactly accord with the Glamorgan examples gathered by Mr. Riddelsdell (see Journ. Bot. 1905, 274), being smaller and fewer-flowered than the East Anglian plant. They agree well with the Friesian specimens sent me by Drs. Focke and Buchenau. Other interesting plants of the county are *Subularia*, *Elatine hexandra*, *Sibthorpia*, *Allium Schænoprasum*, *Juncus acutus*, and *Bromus madritensis*. Since the list appeared Mr. Knight has sent about a hundred additions, mostly adding specimens. I may deal with these later in conjunction with an enumeration of species occurring with or near to the *Liparis*.—ARTHUR BENNETT.

HANTS AND BERKS RECORDS.—I am glad to be able to note the occurrence of so scarce a plant as *Limosella* in North Hants, this making the fifth known locality for the county. On August 10th I found it growing in profusion on the margins of the Emborne stream near Wash Common, and as the stream forms the boundary of Hants and Berks, both counties may claim the plant. In Berkshire *Limosella* is equally rare, only one other locality, near Sandhurst, being recorded by Mr. Druce. At the spot where I found *Limosella* the Emborne is exceptionally low this year, the adjoining mill being not now worked, and this fact together with the dry summer has no doubt produced conditions favourable for the plant's development. There was no trace of *Limosella* when I used to botanize here ten or twelve years ago; indeed the mud on which it now flourishes was then quite submerged. Last July I saw two or three plants of *Euphorbia platyphyllos* L. in a wheatfield near Hamstead Marshall, where it was probably of casual origin. This is the first certain record of the species for Berkshire (see *Fl. Berks*, p. 437).—A. BRUCE JACKSON.

DIANTHUS CARTHUSIANORUM L.—I first found this about 1899, growing in a dry sandy meadow at Byfleet, Surrey, and every year since I have seen it in the same place. There is only one small patch, about two hundred yards from an old farmhouse, and none in any other parts of the field or the surrounding ones. *D. deltoides* grows plentifully in a similar field only separated from it by a narrow lane.—LILLIAN M. AUSTIN.

NOTICES OF BOOKS.

Handbook of Flower Pollination. By PAUL KNUTH. Translated by J. R. AINSWORTH DAVIS, M.A. Vol. i.—Introduction and Literature. 8vo, pp. xix, 382, with 81 figs. in text. Oxford: Clarendon Press. Price 18s. net, cloth; 21s. net, half morocco.

THIS, the most recent addition to the series of translations of German botanical works issued by the Clarendon Press under Professor Bayley Balfour's supervision, renders accessible to English readers a book of the first importance. Paul Knuth's work on Flower Pollination replaces Hermann Müller's *Fertilisation of Flowers by Insects and their Reciprocal Adaptations*, the English edition of which appeared in 1883, as the standard work of reference on pollination. Knuth's work is based on Müller's, and the striking difference in size between the two is an index of the great development of the subject in the years which have elapsed since the appearance of the earlier work in 1873. Paul Knuth's *Handbuch der Blütenbiologie* (1898-99) is well known to botanists. The author's original idea was to republish, with notes, Müller's classical work, on similar lines to those employed with Sprengel's *Entdeckte Geheimniss der Natur*, which was issued in Ostwald's "Klassiker der Exakten Wissenschaften" in 1894 (see *Journ. Bot.* 1894, 218).

But the great development in this branch of botany, and the abundance of new material, rendered necessary an entirely new work, following the lines of Müller, and incorporating his results with the new facts acquired since. The present volume, the English edition of the first volume of the *Handbuch*, corresponds with parts i. and ii. of Müller's work, comprising less than seventy pages, and including the Historical Introduction and some account of the insects which visit flowers. As the *Handbuch* was not reviewed in this Journal, some account of the subject-matter may be given. The First Section—the historical development of flower pollination—contains a reference to the work of J. G. Kolreuter, who, in connection with experiments in hybridization, made numerous observations on the pollination of flowers in the second half of the eighteenth century; a portrait of Kolreuter forms a frontispiece to the volume. An account of Sprengel's work is accompanied by a reduced reproduction of the title-page of the *Entdeckte Geheimniss*; and the history of the subject is followed in the work of Darwin and of the numerous subsequent workers who were stimulated to investigation by the results achieved by him; pre-eminent among these were Hermann Müller and his brother Fritz. The observations of Félix Plateau on the attraction of insects by flowers are discussed in a Supplement later in the book. Plateau contended that insects are guided to flowers, not by their bright colours, but by their sense of smell; but Knuth, like other critics of Plateau's work, is unable to follow him. "His experiments," Knuth says, "only show that the sense of smell perhaps guides insects to a greater extent than has hitherto been supposed."

The Second Section forms an exhaustive review of the present standpoint of flower-pollination, and occupies nearly two hundred pages. It includes a summary of the various arrangements determined by distribution of sexes in time and space, by different forms of flower and other factors, and some account of the insects which visit flowers. The most important part is a grouping of flowers suggested by the author, after consideration of the groupings advanced by Delpino and Müller, according to the mechanism of pollination.

The remainder of the volume, comprising nearly one-half, is occupied with a bibliography, which includes the citations in the original and additions which bring the record down to Jan. 1st, 1904.

Professor Balfour's Prefatory Note supplies the history of the preparation of the English edition, which was begun by Dr. Gregg Wilson and completed by Professor Ainsworth Davis, with the assistance in the bibliographical portion of Mr. J. M. F. Drummond, Mr. S. A. Skan, and Dr. F. E. Fritsch. The second volume of the *Handbuch* is a special account of all known observations upon the pollination of the flowers of plants of Europe and the Arctic zones; the English edition is in the press. The third volume, which was published under Dr. Loew's editorship, after Knuth's death, deals in a similar manner with observations in flower pollination made outside Europe; the English edition will presumably follow in due course.

A. B. R.

A QUEER INDEX.

A New and Complete Index to the Botanical Magazine from its commencement in 1787 to the end of 1904, including the First, Second, and Third Series. To which is prefixed a History of the Magazine by W. BOTTING HEMSLEY, F.R.S., F.L.S. London: Lovell Reeve & Co. 8vo, cloth. Pp. lxiii, 180. Price One Guinea.

THE only name which appears on the title-page of this publication in connection with its authorship is that of Mr. Hemsley, and the casual observer might be pardoned for supposing him responsible for it. Our contemporary the *Gardeners' Chronicle* not only supposed but said so—"this index has been prepared by Mr. W. Botting Hemsley"—and adds that "working botanists and horticulturists cannot be too grateful to Mr. Hemsley for its preparation." Now, as it seems to us, the first glance at any one page of the Index would show that neither Mr. Hemsley nor any other botanist could possibly be held responsible for so illiterate a compilation. The only parallel to it, so far as our experience goes, is the remarkable seed-list issued at Kew twenty years ago (see *Journ. Bot.* 1886, 151), to which, indeed, its index portion bears very close resemblance.

Let us, however, say, before proceeding to justify our criticism, that the introductory portion of the volume, containing the history of the *Botanical Magazine* contributed by Mr. Hemsley to the *Gardeners' Chronicle* of 1887 is full of interest. The curiously worded note prefixed to the history—"Believing it would be of interest to subscribers of (*sic*) the *Botanical Magazine*, it is inserted here with some alterations and additions"—leaves it doubtful whether Mr. Hemsley is responsible for such additions and consequently as to their value; but we understand that he is, as well as for the post-script—evidently written in haste—which brings down the history to 1904.

The work before us has no word of preface or explanation, so that we are left to evolve for ourselves its object and method; the name of the compiler is nowhere given. We can only suppose that some one entirely unfamiliar with botanical nomenclature was put down before a set of the *Botanical Magazine* and told to index everything in the shape of a name, no matter how it might be constructed or of how many words it might consist. No authorities are appended to the names, and there is no indication of which are synonyms and which are retained, all being printed in roman type. The entries are thus often misleading; thus when we look up the reference to *Aconitum Napellus* we find it is of "Thunb. non Linn." When in this *Journal* for 1883 (p. 249) we reviewed the *General Index* to the first 107 volumes of the Magazine produced by Mr. Edward Tonks, we felt compelled to point out its deficiencies, and to express our regret that he did not act on the advice of those who said that "to be a creditable performance [it] should be revised by a competent botanist." But Mr. Tonks's—or rather Mr. Buckley's

—compilation was a monument of accuracy and erudition compared with the Index now before us.

To enter into detail, *all* names quoted in synonymy, including pre-Linnean ones, are cited exactly as they stand, so that under “Arbor,” “Flos,” and the like, we have lists such as the following :—

“ Arbor Africana	Arbor foliis Rhamni
Americana	fraxini folio
baccifera	Javanensis
calapoides sinensis	Judæ
cornigera	lactaria
cucurbitifera Americana	mexicana
finium Regundorum	ragoe Amboinensis
flore luteo	sinensis.”

Equally strange names appear under accepted genera—*e. g.* :—

“ Atractylis foliis cartaligineis	Atractylis Theophrasti et
Fusus agrestis	Dioscoridis vera.”
oppositifolia	

Of these, all except the third are synonyms of *Carthamus lanatus* (B.M. 2142). Under *Primula* we find

“ foliis ellipticis	foliis subhursutis [<i>sic</i>]
ovatis	utrinque viridibus.”

Under *Gentiana*—

“ floribus campaniformibus	floribus lateribus
confertis	ventricosus.”

These examples might be indefinitely multiplied. It may be said that these, like “Franklin’s Tartar” and “Fortune’s Double Yellow” (which are also given) are merely useless incumbrances; but such binominals as *Helleborus ramosissimus*, *Dentaria aphyllus*, *Bandura Zingalensium*, *Chamæcistus hirsuta*, have the appearance of accepted names, and may bother future indexers, as neither italics nor synonyms indicate their insignificance.

Among misspelt names of genera may be mentioned “Arthrosteinma” and “Bachhousia”; among species “apullaceum” and “Natulensis.” But it is fair to say that, considering the nature of the work, the misprints are fewer than might have been expected, though a curious air of illiteracy is given by the random use of capitals under almost every genus; thus under *Babiana* we have

Disticha	Sambucina	Sulphurea
plicata	Socotrana	Tubiflora
purpurea	Spathacea	Villosa
ringens	Stricta	

There is no need to say more of this unfortunate publication; it is astonishing that it should have been issued by a firm of which the present head, as Mr. Hemsley tells us in his “History,” “has been actively connected with the *Botanical Magazine* for the last

forty years " and is moreover a Fellow of the Linnean Society. An index which should embody at least such corrections as have been made in the Magazine itself would no doubt be useful, but this could only be undertaken by a botanist, or at least by some one acquainted with botanical nomenclature and its rules. The index before us, for example, includes two references to *Cypripedium parviflorum*; a botanist or even an intelligent compiler would have noticed that under the second reference it is stated that the plant first figured as *C. parviflorum* was really *C. pubescens*, and would have entered the latter name in the Index, from which it is at present absent. We only regret that the space and time wasted by the insertion of thousands of useless entries should not have been devoted to an index of the names of the persons mentioned in Mr. Hemsley's "History," as such a list is badly needed.

BOOK-NOTES, NEWS, &c.

MR. C. G. LLOYD has just issued the results of his studies on the *Tylostomeæ*. The genera described by him are *Queletia*, *Dictycephalos*, *Schizostoma*, *Battarea*, *Battareopsis*, *Chamydopus*, and *Tylostoma*. The last named is the largest genus of the family, and is well represented in America, though only one species, *Tylostoma mammosum*, is known in Britain. With one or two exceptions, all the plants of this family are rare; several of them have only one record. Mr. Lloyd's notes, as usual, enlighten and enliven the lists and descriptions, and the species are illustrated by photographs taken from the plants in the various herbaria visited by Mr. Lloyd, who again begs for specimens of *Gasteromycetes* from collectors, and asks for any information that his readers can send him as to the occurrence of *Battarea* in this country. His address is 24 West Court Street, Cincinnati.

MR. V. H. BLACKMAN, who has been for ten years an assistant in the Department of Botany of the British Museum, has resigned his appointment on taking up the post of Lecturer in Botany at the Birkbeck Institute, which he will hold in conjunction with a lectureship at the East London College.

THE representation of British plants in the Botanical Gallery at the Natural History Museum has been augmented by a set of *Characeæ*, presented by Messrs. H. & J. Groves. The specimens occupy several frames on the same pedestal with the mosses, and are arranged according to the recent edition of Babington's *Manual*. A set of British lichens for the use of the public, illustrated with water-colour drawings of the genera, is also being placed in a cabinet in the gallery.

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A. *Prunella laciniata* L.

B. *Lithospermum officinale* var. *pseudo-latifolium* C.E.Salm.

C. Hairs of *Anagallis*.

PRUNELLA LACINIATA L. IN BRITAIN.

BY JAS. WALTER WHITE, F.L.S.

(PLATE 482A.)

TWENTY years ago I noticed a cream-flowered *Prunella* in more than one spot on the Mendip Hills, but carelessly let it pass for a colour-sport of *P. vulgaris*. In 1899 Mrs. Gregory called my attention to it, and I then suspected that this plant might be a continental form hitherto unrecorded in Britain; but it was not until this summer that I collected a series of specimens and worked them out. The light afforded by available French and German books makes it evident that the plant is much more than a variation of the common Self-heal. It has, in fact, precisely those structural characters assigned to *P. laciniata* L., which, I think, there can be no doubt is a good enough species.

PRUNELLA LACINIATA Linn. Sp. Pl. ed. ii. 837 (1763).

P. alba Pallas ex M. Bieb. Fl. Taur.-Cauc. ii. 67 (1808); Jacq. aust. tab. 378; Mutel, f. 385; Parkinson, Theatr. Bot. 527.

Plant branched at the base; stems four to eight inches, procumbent or ascending, downy. Leaves stalked, oval-oblong, downy, entire, or with basal teeth, the upper ones mostly pinnatifid. Spike large, furnished at the base with two long narrow toothed floral leaves that exceed it; upper lip of the calyx with broad oval teeth, the lower divided to the middle, its teeth lanceolate, subulate, attenuate into setaceous points, pectinate, with long stiff ciliæ. Corolla large, cream-coloured, the two longer stamens bearing below the summit a subulate arcuate point directed downwards.

HAB. Upland limestone pastures with a south-west exposure at an elevation of 500-600 ft., overlooking the moors between Draycott and Cheddar, North Somerset. Flowering appears to be over before the end of July.

The distribution, according to Nyman, has included the whole of Europe excepting Britain, Scandinavia, Northern Germany, and Central and Northern Russia. The species is said to grow on dry calcareous hills—rarely, if ever, on other soil—and to be much less common than *P. vulgaris*. The older botanists and herbalists—Lobel, Bauhin, Clusius, &c.—evidently knew it well as a native of France and Germany. The woodcut in Parkinson makes a very fair figure, and the Jacquin tab. is most admirable.

There appears to be no doubt that we must call our plant *P. laciniata* L., as is done by Nyman, and by the editors of Koch's *Synopsis*, ed. iii., although, in its literal meaning, the name is applicable only to the form with divided leaves. Linnæus, in Sp. Pl. ed. i. (1753), has "*P. vulgaris* γ *laciniata*," of which he says, "Tam multa habet in fructificatione communia, ut vix videatur distincta." In ed. ii. 837 (1763) he raises it to the rank of a species, but writes, "Fructificatio omnino *P. vulgaris* a qua olim orta;

structura hodie persistens; adeoque tantillum distincta." The arrangement by Grenier and Godron under *P. alba* Pallas, which was adopted also by Willkomm and Lange in the *Flora Hispanica*, if inadmissible, was certainly convenient. Some of my specimens have their leaves entire save for two teeth at the base of each upper one, and so correspond to *a integrifolia* Godr.; whilst in others the stem-leaves are deeply pinnatifid, with narrow segments, thus agreeing with *β pinnatifida* Koch. The spikes are bigger and broader than in the common species, and are usually (but not always) exceeded by the narrow toothed floral leaves. The flowers are large and cream-coloured, not pure white, as are those sometimes produced by *P. vulgaris*. More important characters are furnished by the calyx and longer filaments. These are illustrated in the annexed figure. The plate in *English Botany* shows a filament-appendage too much bent. Although it follows the natural curve of the filament, the point of the appendage in *P. vulgaris* is straight, and not directed downwards. In *P. laciniata* the appendage is strongly arcuate in such a way as to make an angle of 40–45 degrees in the fresh state, and to become in the dried plant almost vertically deflexed. Brand, in Koch's *Synopsis*, ed. iii. p. 2149, records hybrids of *P. laciniata* with both *vulgaris* and *grandiflora*, but I can find no mention of intermediates connecting the respective species.

Mr. Britten tells me that there is at South Kensington, in the British Herbarium, a small specimen labelled *P. alba* from "Hill at Hinchwick Warren, 4 miles from Moreton-in-Marsh, Gloucestershire; H. Weaver, 1886." This Moreton-in-Marsh gathering was reported as *P. vulgaris* var. *alba* by Mr. Weaver in *Journ. Bot.* 1887, p. 84, and at the time was thought to have been introduced there with foreign corn. I have been in communication with Mr. Weaver, and have learnt that three years ago he met with the same plant in Berkshire, two miles west of Reading, "in an undisturbed rough pasture suggestive of enclosed common-land." Mr. Druce has accompanied Mr. Weaver to this locality, and they found the plant very sparingly near Tilehurst. The field was much drier than when Mr. Weaver first visited it, but they found the original patch, and also met with the plant in another portion of the field which contained no introduced species. It was probably formerly part of a common, although now enclosed.

I am much indebted to Miss F. Cundall for the capital sketch, which has been reproduced; to Mr. Cedric Bucknall, who has helped me with *camera lucida* drawings; and to Mr. Britten for the Linnean quotations.

PLATE 482 A.—1. *Prunella laciniata*, nat. size. 2. Calyx and longer stamen of the same, $\times 4$. 3. Calyx and longer stamen of *P. vulgaris*, $\times 4$.

A NEW VARIETY OF LITHOSPERMUM OFFICINALE L.

BY C. E. SALMON, F.L.S.

(PLATE 482B.)

IN August, 1900, when botanizing in a wood between Steephill and St. Lawrence, Isle of Wight, I was struck with the appearance of a fine Boraginaceous plant, in seed, which seemed quite new to me. A closer examination showed the remarkable polished stony nutlets of *Lithospermum officinale*, but there was little else in common beyond a tufted habit of growth.

Upon referring to descriptions of continental and British authors, *L. officinale* seems to be remarkably free from recorded varieties, but the following diagnosis seemed to fit the Isle of Wight specimens:—*L. officinale* β *majus*, foliis ovatis. . . . Duplo altior foliis ovatis, nec lanceolatis brevioribus atro viridibus. Willd. *Sp. Plant.* 751 (1797). This variety, cited as “var. *latifolium* Willd.” (which name I cannot find elsewhere), is stated by Asa Gray (*Syn. Fl. North America*, 203 (1878)), to be synonymous with *L. latifolium* Michx. (which is found only in North America), but the Isle of Wight plant does not agree with the latter in several points.

The new variety, which I propose to call *pseudo-latifolium*, may be distinguished from *L. officinale* by its less strict habit and branches, its green (not grey) leaves, which are broadly ovate-acute or ovate-lanceolate, broad based, much less hairy beneath than in type, and more spreading; floral leaves (or bracts) ovate.

L. latifolium was described by Michaux (*Fl. Bor. Amer.* 131 (1803)), as follows: “*L. foliis lato-ovalibus, nervosis; supra glabriusculis, viridibus et asperis; calycibus fructiferis patulis; seminibus turgide ovatis, lucidis, undique cavo-punctatis*. Obs. Affinis *L. officinale* L. Hab. in umbrosis sylvis Kentucky.”

Although the leaf-characters described above are very near those of the suggested variety, yet the following points (amongst others) amply distinguish Michaux’s plant from *officinale* forms: Corolla tube only a little longer than the limb; fruiting calyx spreading; nutlets over two lines long [and cavo-punctate].

I have placed in brackets the alleged punctate character of the seeds of *L. latifolium*, as, although this feature was mentioned in the original description of Michaux, repeated verbatim by De Candolle in his *Prodromus*, and modified to “very smooth or sparingly impressed-punctate” by Asa Gray (*Man. Bot. U. S.* (1856)), it is wholly omitted from the last-named botanist’s *Fl. North America* (1878), and again from Britton & Brown’s *Fl. of N. States and Canada* (1898). The late Mr. F. Townsend, who was interested in the Isle of Wight plant,* showed me a specimen of *L. latifolium* from America. We both failed to see how its seeds differed from those of *L. officinale* as regards surface-markings; there are often small impressed dots or lines upon the nutlets of both species.

* See *Fl. Hants*, ed. 2, 319 (1904).

L. officinale var. *pseudo-latifolium* is evidently a lover of shady places, as its varietal characters show, but it has retained them in an open garden at Reigate (where I have grown the plant since 1901). Mr. Townsend also obtained examples from seeds sent him, and found that the plants came true. As far as the stock will allow, I shall be very pleased to send seeds to anyone wishing to grow the variety.

A specimen in Herb. Holmesdale Nat. Hist. Club, Reigate, collected at West Dean, Sussex, may prove to be the var. *pseudo-latifolium*, but until the plant is gathered again there it would be unwise to name definitely an example which seems correct, but is only a small portion of a whole plant.

Another specimen gathered by Mr. A. Somerville at Machrie, Arran, 1904, "in shade of high rocks," approaches the variety in colour and hairiness of leaves, but these are not broad-based as in *pseudo-latifolium*.

PLATE 482 B.—*Lithospermum officinale* var. *pseudo-latifolium* C. E. Salmon. 1 & 2, stem-leaves; 3, bract.

ANAGALLIS ARVENSIS AND A. CÆRULEA.

BY JAMES EDWARDS.

(PLATE 482 C.)

THE following statement of the differences observed, during several successive years, between living plants growing on Inferior Oolite at an elevation of about 650 ft. in fields formerly arable but out of cultivation for more than thirty years past, is offered as a contribution to the history of these two species. I am induced to use the term species because I have neither seen nor read of any of those intermediate gradations, the existence of which, according to Darwin (*Origin of Species*, 1859, p. 485), is the only distinction between species and varieties.

arvensis.

Stem procumbent.
Flowers orange-red, with a blood-red eye.
Calyx in the closed flower two-thirds, or less than two-thirds, as long as the corolla.
Corolla-segments broadly rounded, fringed with clavate hairs, which consist normally of three cells.

cærulea.

Stem ascending or erect.
Flowers bright blue, with a pink eye.
Calyx in the closed flower as long as the corolla.
Corolla-segments apparently narrowed to the apex, where there are a few small teeth, and, at most, a few hairs on the edge, which consist normally of four cells, and are scarcely clavate.

Variations in the colour of the flowers of *arvensis* are recorded, namely, flesh-coloured—*carnea* Schrank, wholly white or white with a pink eye (Groves' edition of Babington's *Manual*, 1904, p. 343); purple, green edged or tinged with purple (Pryor, *Flora of Hertfordshire*, 1887, p. 342); very pale lilac, var. *pallida* (Purchas & Ley, *Flora of Herefordshire*, 1889, p. 244); dull blue, and blue. The corolla-segments in *cærulea* are not really narrowed to the apex, but in consequence of the sides towards the apex being inflexed they have that appearance. This circumstance, together with the comparatively longer calyx, gives the open flower in the vertical aspect a characteristic outline, namely, that of a star with five somewhat lanceolate rays alternating with five very narrow and pointed ones. In the open flowers of *arvensis*, owing to the comparatively shorter length of the calyx-segments, and the flat position of the corolla-lobes, only the extreme apices of the former are visible from above.

On examination with a hand-lens of the hairs on the edge of the corolla in the two species, it appeared to me that those of *cærulea*, besides being very much fewer in number, were also of a different character from those of *arvensis*, and this view was confirmed by examination under the microscope; from which it is clear that in *arvensis* these hairs are normally composed of three cells, of which the ultimate is large and clavate, whilst in *cærulea* the hairs are normally composed of four cells, of which the ultimate is large and oblong, with the sides usually feebly excavate.

Smith, writing in 1798, had not then found any specific difference between the red and blue pimpernel. The plate of the latter, published by Sowerby, Dec. 1st, 1807 (E. B. 1823), gives a recognizable figure of the whole plant, but the outline enlarged drawing of a single flower is very inexact, as it represents the edge of the corolla jagged throughout, whereas its lobes are, in fact, denticulate only near the apex. The letterpress to this plate does not serve to elucidate the distinctions between the two plants, but it is worthy of note that the obvious ciliation of the corolla in *arvensis* did not escape the attention of the artist (E. B. 529), whilst he failed to record any hairs whatever on the edge of the corolla of *cærulea*. In Hooker's *British Flora* (fifth edition, 1842) the corolla of *arvensis* is described as having the margin crenate, piloso-glandulose, and that of *cærulea* as having the margin toothed, scarcely at all glandulose. This is a fair statement of the index characters of the two plants, outside considerations of colour. The author knew two forms, as they exist to-day—one with the margin of the corolla "piloso-glandulose," the other with the margin "scarcely at all glandulose," and there is not, in the descriptions themselves, any indication that these characters were not to be regarded as distinctive. A few lines further on, however, we read: "The Rev. Professor Henslow has proved, by cultivation from seed, that *A. cærulea* and *A. arvensis* are varieties of the same species." This statement is repeated in the eighth edition (1860) of the same work, with the additional information that "on the other hand, Mr. Borrer is of opinion that our two varieties are distinct species, but that each varies with the same tints of colour." A somewhat more intelligible rendering of

Borrer's opinion is that given by Syme (E. B. iii. vol. vii. p. 152), who says: "Perhaps the true solution of the difficulty is that suggested by Mr. Borrer, viz. that there are two plants, each of which varies with red or blue flowers." In Sir J. D. Hooker's *Student's Flora* (1870) no reference is made either to Henslow's proof or Borrer's opinion, but, apparently by way of compromise, the corolla-lobes of *arvensis* have become "*usually glandular ciliate*," and those of *cærulea* "*rarely ciliate*"; the latter a very different thing from the "*scarcely at all glandulose*" of the older works. Syme (*op. cit.*) says that blue-flowered plants do occur with the corolla-segments glandular ciliate; and Trimmer (*Flora of Norfolk*, 1866, p. 117) raised in 1865, from seeds of *arvensis*, var. *badia*, plants which produced dull blue flowers having the petals fringed with glandular hairs. I have been unable to find any definite record of a red pimpernel without the fringe of hairs to the corolla, though Prof. Boulger (in his edition of Johns' *Flowers of the Field*, 1899), writing of *cærulea*, says: "A more erect plant without the fringe to its petals, which are usually bright blue; but perhaps occasionally red." Dunn (*Alien Flora of Britain*, 1905, p. 129) says: "With regard to the variety *cærulea*, the plant recorded under this name by British botanists is the blue-flowered form of the Pimpernel, differing from the type in no other respect than colour." The accuracy of this statement is very doubtful, having regard to the fact that the pimpernel with blue flowers without a fringe to the corolla-segments was distinguished by Sir W. J. Hooker and his coadjutor up to 1870, when "Hooker" and "Hooker & Arnott" were succeeded by *The Student's Flora*.

PLATE 482 c.—Hairs from edge of corolla of *Anagallis arvensis* (1) and *A. cærulea* (2), $\times 375$.

CHARLES BARON CLARKE

(1832–1906).

(WITH PORTRAIT.)

[WE are indebted to Colonel Prain for the following account of Mr. C. B. Clarke's botanical work, and to the Rev. W. H. Bliss, Vicar of Kew, for a sketch—the accuracy of which all who knew the deceased botanist will recognize—of his personal characteristics. It may be mentioned that Mr. C. B. Clarke was the younger brother of Benjamin Clarke, of whom he contributed an (unsigned) notice to this Journal for 1890.—ED. JOURN. BOT.]

CHARLES BARON CLARKE, who died at his residence at Kew on the 25th of August, was the eldest son of Turner Poulter Clarke, J.P. He was born at Andover, Hampshire, on June 17th, 1832. He was educated at King's College School, London, where the late Henry Fawcett was one of his contemporaries. Proceeding to



Photo. by Messrs. Maull & Fox.

West, Newman proc.

Yours very truly,
C.B. Clarke

Cambridge, Clarke was a member of Trinity, afterwards of Queen's. He took the degree of B.A. in 1856, and was bracketed Third Wrangler in that year. He became a Fellow of Queen's College in 1857; was called to the Bar at Lincoln's Inn and appointed Mathematical Lecturer of his College in 1858; in 1859 he took the degree of M.A.

At Cambridge Clarke was one of a circle, which included his friends Fawcett, Leslie Stephen, and Rigby, whose members held advanced economic views. His interest in political economy continued throughout his life, and found expression in his conversation and correspondence, and in occasional essays and pamphlets. His sympathies were wide; his knowledge was extensive; he stated his views fairly, and his conclusions clearly. Treating economics as an exact science, he nevertheless dealt neither with the people nor the land as abstractions. On the contrary, his interest in the one underlay his ethnological and historical enquiries; his interest in the other led directly to his geological and botanical studies. Always a traveller and a mountaineer, Clarke, during College vacations, paid annual visits to the north of England. Leslie Stephen records that during one of these—Easter, 1865—he and Clarke made the ascent of the Pillar Rock in Wastdale. During his residence at Cambridge, Clarke paid at least two visits to Scotland, on one occasion getting as far as Skye; he paid several visits to Switzerland, making ascents in the Alps, the last of these visits being in 1865; he also, in 1862, visited Madeira. During most, if not all, of these journeys Clarke was an assiduous botanical collector; but his most sustained work in this direction was done in northern Hampshire, and before he severed his connection with Cambridge in 1865, in order to take up educational work in India, he had prepared a list of the flowering plants of Andover, his native place.

Clarke was appointed to the Bengal Educational Department on Dec. 8th, 1865, and in 1866, shortly after reaching Calcutta, he printed there this Andover list, which was the subject of an interesting review and an equally interesting rejoinder in these pages at the time that it appeared.* At first attached to the teaching staff of the Presidency College, Calcutta, Clarke was soon made an Inspector of Schools, and posted to the Eastern Division of Bengal, with his headquarters at Dacca. The work of an inspector, involving as it does continuous touring for a considerable portion of each year, provides ideal opportunities for the study of the vegetation of the country traversed. Clarke made the most of these opportunities throughout his service, and supplemented them by visits to other districts and provinces whenever he could. In Eastern Bengal the most convenient method of travelling is by boat on the great rivers, and early in 1868, by the wreck of his boat, Clarke lost the whole of his Bengal collections, which we know, from his field-tickets, already amounted to nearly seven

* See Journ. Bot. 1867, 51; 1868, 215.

thousand numbers. Undiscouraged, Clarke began afresh; his collections, as we know them, commence with May, 1868.

Early in 1869, on the recommendation of Dr. T. Anderson, who was then being invalided to England, Clarke was appointed to act as Superintendent of the Royal Botanic Garden, Calcutta, and of Cinchona Cultivation in Bengal. Here he found, as others have done, that the pressure of administrative duties leaves little time for scientific study, and complained that during a year of the superintendentship he had been able to do less real botanical work than he could do in a month as a travelling Inspector of Schools. Anderson died while on leave in October, 1870, but Clarke had to continue to officiate in both posts till, in July, 1871, he was relieved by his friend Dr. (now Sir) G. King, who had been appointed Anderson's permanent successor. To Clarke this was a real and not merely a technical "relief." On reverting to his inspectorship at Dacca he renewed his collecting work with greater zest than ever.

It appears that while collecting generally between 1866 and 1869, Clarke was particularly attracted by the natural family *Commelinaceæ*, as to which he made many notes and critical observations. His stay at the Botanic Garden, if it gave him less time for collecting than he desired, afforded him the use of a well-equipped herbarium, and enabled him to commence the study of the *Cyrtandraceæ*, in later years another of his favourite families, and to arrange the material illustrating the *Gentianaceæ*, of which an account was published by the Linnean Society in 1875. Another family which he then studied closely, but which did not subsequently particularly attract him, was the *Urticaceæ*.

Dacca remained Clarke's headquarters till 1874, and during the period of his inspectorship of the Eastern Division he was able to investigate not only the vegetation of the whole of Eastern Bengal, Sylhet, and Comilla, but to study on the spot the flora of the Khasia Hills, of Chittagong, of the Eastern Sundribuns, and of the Madhopur jungles in Western Mymensingh, an interesting area where low hills clad with a forest quite unlike that of the adjacent plain crop up through the Bengal alluvium. His appointment to the Botanic Garden also afforded him his first opportunity of botanizing in Sikkim, and enabled him in 1869 to pay a short visit to the Yakla, one of the high eastern passes. An official visit that he had to pay to Madras in 1870 gave him besides an opportunity of making a botanical collection in the Nilgiri Hills.

In 1874 Clarke was transferred to the Presidency division, with his headquarters at Calcutta. From this centre he was able to pay his first visit to Chutia Nagpur, to investigate the Western Sundribuns, and to spend a holiday of six weeks' duration botanizing in the Panjab Himalaya. His residence at Calcutta once more placed the collections of the Botanic Garden at his disposal, and so enabled him to complete and publish his monographs of the *Commelynaceæ et Cyrtandraceæ bengalenses*. Shortly after leaving the Garden in 1871 he had become much interested in the natural family *Compositæ*. While in Calcutta in 1874 he completed his monograph of

the *Compositæ Indicæ*. In this year, also, he, at his own cost, reprinted *literatim* Carey's edition of Roxburgh's *Flora Indica*. Early in 1875 he revised the genus *Leea* in a paper which was subsequently (1881) published in these pages.

In 1875 Clarke was transferred to the Northern Division of Bengal, with his headquarters at Darjeeling. From this centre he was able to make two more autumn journeys in Sikkim. One of these, along the Nepal frontier of British Sikkim, was described in the Linnean Society's Journal in 1876. The other was made to Western Independent Sikkim (Jongri), going by Pemiongchi and Yoksun, returning to Darjeeling by Singalelah. He also paid a visit to British Bhutan, east of the Tista; and in 1876 was able to pay a spring visit to the Chola and other eastern passes, and to study the Sikkim rhododendrons *in situ*. The cold weather which intervened between his Jongri and Chola journeys was spent on tour in the plains of North Bengal. His attention was now especially given to the *Glumaceæ* as a whole. During this tour he succeeded in seeing his *Compositæ Indicæ* through the press. When the tour was over, Clarke obtained leave for three and a half months, and devoted this to a visit to Kashmir and the Karakoram range, his longest and most arduous individual journey. On his return, Clarke again spent the cold season (1876-77) on tour in North Bengal. During this period his interest in *Glumaceæ* became more particularly limited to the *Cyperaceæ*, which from this time continued to be his favourite order.

In March, 1877, he came to Europe on furlough, and, after a short visit to Italy, settled down in June to work at Kew on his extensive collections, which now amounted to some 25,000 numbers, representing about 5000 species; the whole he presented to the Kew Herbarium. In connection with his work Clarke wrote the accounts of several natural families for the *Flora of British India*; six of these were published in Part V. (vol. ii.) of the *Flora* in 1878. Instead of returning to India on the expiry of his leave in 1879, Clarke was placed on special duty in England to assist Sir Joseph Hooker in the preparation of the rest of the *Flora*. During this deputation, which lasted till April, 1883, Clarke wrote the accounts of about forty other orders, which were published in the second, third, and fourth volumes of the *Flora* between 1879 and 1884. In 1879 Clarke visited Paris in order to study the material of the family *Rubiaceæ* on behalf of the *Flora of British India*, and of the family *Commelynaceæ* for a monograph which he wrote for De Candolle's *Monographiæ Phanerogamarum*, published in 1881. In 1882 he paid a similar visit to Geneva to study the *Cyrtandraceæ*, which he also monographed for De Candolle; this work was published in 1883.

When his deputation expired, Clarke returned to India. On arriving, he was again posted to the Presidency division, and from his headquarters at Calcutta was able to make botanical excursions to Jessore and elsewhere in the Bengal plain, and to pay a long official visit to Chutia Nagpur, in the course of which he ascended

Parasnath, and botanically explored Sirguja, a native state in the extreme south-west, bordering on the upper Mahanadi. Some of the results of this journey appeared in the Linnean Society's Journal for 1884. Later in the year he spent his vacation in Lower Sikkim, the Terai, and the Duars. During this year he had to resume temporarily the work of Professor of Mathematics at the Presidency College. In December of the same year he was appointed to officiate as Director of Public Instruction in Bengal; and in March, 1885, he was transferred, as Inspector of Schools, from Bengal to the Province of Assam, with his headquarters at Shillong. This fortunate change of province enabled Clarke to increase his knowledge of the vegetation of the Khasia Hills, where he made many botanical excursions, to study the flora of the Assam Valley from Sadiya to Dhubri, and to visit the Naga Hills and Manipur. The journey in which this visit was paid was perhaps the most important, certainly the most arduous, since his visit to the Karakoram. In its course he was able to ascend Japov, the highest peak of the Bareil range, nearly 10,000 ft. elevation. The results of this journey were published in the Linnean Society's Journal in 1889. On attaining the age of fifty-five, in June, 1887, Clarke retired from the service of the Government of India.

On his return to England, Clarke made over to Kew the first share of the collections brought together during his second period of residence in the East, and settled down in the neighbourhood of the Herbarium in order to examine his Indian specimens critically, and to prepare a monograph of the natural family *Cyperaceæ*, in which he had been especially interested for some twelve years. From what has been said above it will be seen that the opportunities for botanical work which fell to Clarke in the course of his official duty, or which he made for himself during holiday intervals, were, throughout his Indian service, quite exceptional. Energetic and tireless, careful and exact, he was an ideal collector. His tickets give precise references to locality and altitude; his field notes, if often brief, are always to the point, and are frequently accompanied by useful analyses made at the time of collecting. More important still, each specimen bears a different field number, so that confusion in citation is impossible. The specimens themselves are always well selected and scrupulously prepared. A striking feature of Clarke's collecting work is the particular attention given at different periods to special natural families: *Commelynaceæ*, between 1866-69; *Cyrtandraceæ*, 1869-71; *Compositæ*, 1871-74; *Glumaceæ*, generally from 1874 onwards, but with especial reference after 1876 to *Cyperaceæ*. Another feature of his work was his preponderating interest in herbaceous species, and the comparative indifference with which he regarded trees.

In connection with his study of the *Cyperaceæ*, Clarke, after his retirement, worked up the material of this family at Kew and in many other collections. He elaborated the account of the *Cyperaceæ* for the *Flora of British India*, published in 1893-4; for the *Flora Capensis*, published in 1897-8; for the *Flora of Tropical Africa*, published in 1901-2; and for the *Index Floræ Sinensis*, issued in

1903-4. In addition to these larger contributions to our knowledge of this family, he wrote many papers on the same subject, and identified the species in various collections from all parts of the world. His minute and exhaustive knowledge of the family he turned to further account in determining the relationship between biologic regions and tabulation areas in a paper which appeared in the *Philosophical Transactions* in 1892. - In 1898, in a paper in the *Linnean Society's Journal*, he again made use of his familiarity with the *Cyperaceæ* in defining the limits of the subsubareas included in the tabulation area of British India.

While, however, Clarke's attention was, during the nineteen years he worked at Kew, given largely to this particular family, as regards which he became the recognized authority, his interest in *Cyperaceæ* was by no means exclusive. He described the *Gesneraceæ*, the *Acanthaceæ*, and the *Commelynaceæ* both for the *Flora of Tropical Africa* and for the *Flora Capensis*; also the *Gentianaceæ* and *Acanthaceæ* of Malaya, and determined or described the plants of various other natural families in Schmidt's *Flora of Koh-chang*, and elsewhere. In connection with his work on the African *Acanthaceæ*, Clarke visited the Berlin Herbarium in 1897, and worked over the material of the family in that collection. One of the last pieces of work on which Clarke was engaged was the completion of Lowe's *Flora of Madeira*; his fatal illness overtook him while he was preparing a memoir of Lowe. His monograph of the *Cyperaceæ*, practically complete, is still unpublished.

A frequent and welcome contributor to these pages, Clarke, particularly as he advanced in years, became very catholic as regards channels of publication. His earlier papers are frequently piquant, not to say pungent, as well as clear. He grew old with infinite grace, and while the pungency largely disappeared from his contributions, the lucidity remained. The kindest of men, the most modest and the most unselfish, he was always ready to help others with regard to their work, was a charming host, and a staunch friend.

Clarke joined the Linnean Society in 1867, shortly before the loss of his first collection. He joined the Council for the first time in 1880, while on deputation at Kew assisting in the preparation of the *Flora of British India*; from that time onwards he served on the Council during sixteen years, was Vice-President on seven occasions, and served as President for two years, 1894-96.

He was elected a Fellow of the Royal Society in 1882, and served on the Council during 1888-90. He was also a Fellow of the Geological Society.

D. PRAIN.

It was my privilege to reckon Mr. Charles Baron Clarke among my friends for close upon twenty years. We saw the more of one another as his house and mine are only about three minutes' walk apart. Soon after Mr. Clarke came to live in Kew I had an introduction to him from one of the closest friends of my undergraduate days at Oxford, under and with whom Mr. Clarke had worked for

many years in the Education Department at Calcutta and Darjeeling. In his note he spoke of Mr. Clarke as "simply the ablest man I ever came across."

What was, I think, so striking and peculiar about our departed friend was the variety of the fields of knowledge in each of which he seemed equally at home; the accuracy and the detail with which he knew his subjects, and his readiness to pour forth on all occasions the abundant treasures of his keen brain and retentive memory. So that a conversation with him was among one's greatest enjoyments; especially as one needed not to say more than just enough to show an intelligent sympathy with his flow of interesting and illuminating talk. Whether the subject were tea-planting in Assam, Christian missions in Bengal, university studies at Cambridge nearly half a century ago, or a score of others, he seemed not only to know about it, but to know and have at his finger's-end all about it.

One of the strong links that bound him and me together was interest and delight in good music. An amusing illustration of his keen enjoyment of high-class music, vocal and instrumental, was furnished by the fact that some years ago we issued cards for music on three evenings at the Vicarage, friends being free to choose one of the three; Mr. Clarke came to them all.

In one of the earlier years of our friendship I was anxious to find some one to tell a gathering of parishioners something about Christian missions in India, and only thought of Mr. Clarke in this connection as one whose knowledge extended over an extraordinarily wide radius. But even so, when I broached the subject to him I could not help feeling tickled at his at once replying, "Well! if there is one thing I think I know about more than another it is Christian missions in India." He not only came and gave the address, but drew a special map on a large scale to illustrate his remarks, and the only difficulty he felt was to keep his interesting and instructive information within moderate limits. (Chota Nagpore was the scene of one or two incidents upon which he dwelt. At that time the name was new to me, and therefore is perhaps the better remembered.)

No account of Mr. Clarke's private life would be complete without cordial recognition of his hospitality and simple unselfish kindness. In many years past I have met at his table many interesting and not a few distinguished members of the Indian Civil Service, including more than one who were friends of mine at Oxford nearly fifty years ago.

Mr. Clarke was one of the most regular worshippers at the parish church (on Kew Green), was deeply interested in all our musical doings there, and was "hand and glove" with the choir master. He was also proud of the musical reputation of Andover and the Test Valley—the neighbourhood to which his family belongs. Another of Mr. Clarke's characteristics was he really did not seem to know how to make a disparaging remark on anyone who happened to be under discussion, however open to criticism he or his conduct might seem, and he would frequently recall anyone

from whom such remark might have fallen to the more favourable side of the character, or to a kinder interpretation of the incident which had called forth the adverse note; and I think he never said a word behind a man's back that he would not as readily have said to his face. He spoke favourably, or he said nothing.

The friend to whom I referred at the beginning of these lines wrote to me when he heard of Mr. Clarke's death, "He was of all the men I have ever known the one who combined brilliancy of intellect with the most qualities which win the love of other men." And when he lay dying I met a lady, an old friend and neighbour of his, at the door, where we had been making enquiries, who said, "What a loss he will be! everybody that knows him loves him."

W. H. BLISS.

ON THE GENUS *CLARKELLA* (RUBIACEÆ).

By FREDERIC N. WILLIAMS, F.L.S.

CLARKELLA (Ord. Rubiales, Nat. Fam. Rubiaceæ, Subfam. Cinchoninæ, trib. Oldenlandiæ Schumann).—Hook. f., Fl. Brit. Ind. iii. 46 (May, 1880); Engl. & Prantl, Natürl. Pflanzenfam. iv. abt. 4, 31 (1891); Torre & Harms, Gen. Siphonog. 492, n. 8165 (fasc. 7, 1905).

Calycis tubus obconicus, ovarium excedens; limbus dilatatus 5-7-dentatus, persistens. Corollæ tubus tubuloso-infundibuliformis, calycem excedens; limbus quinquelobus, lobis lanceolatis. Stamina 5, tubi basin versus inserta, inclusa; filamenta brevia tenuia; antheræ dorso affixæ lineari-oblongæ, basi bifidæ, lateribus inter se subconnexis. Discus carnosus annularis. Ovarium biloculare: stylus brevis, tubi corollini fere ima basi insertus, parte indivisa filiformi, rami 2 tenues pilosi stigmatibus minutis pileati. Ovula placentis adscendentibus infra septi medium affixis ubique inserta. Capsula bilocularis membranacea obconica indehiscens 5-7-costata, limbo calycis amplius dilatato coronata. Semina minuta, irregulariter ellipsoidea, numerosa, testâ nigrâ papillosâ; albumen carnosum. Embryo clavatus bilobus.—Herba perennis, exigua erecta, omnino hispidula. Folia petiolata ovata; paris inferioris uno sæpius suppresso alteroque e contrario ampliato. Stipulæ integræ minutæ, late ovatæ vel obsoletæ. Flores albi, in cymam terminalem bracteata pedunculatam dispositi.

A genus founded by Sir Joseph D. Hooker on *Ophiorrhiza nana*, named after his friend and co-worker, the late Mr. C. B. Clarke, and including only a single species. Its systematic position in the family is between *Silvianthus* Hook. f. and *Argostemma* Wall. The description here given, both of the genus and the species, has been drawn up from the authentic material in Herb. Kew., with the assistance of the original English description.

CLARKELLA NANA Hook. f., Pl. Brit. Ind. iii. 46 (May, 1880); Strachey & Duthie, Cat. Fl. Kumaon, 80 (1906).

Radix tuberosa: tuber parvum carnosum, vaginâ crassiusculâ

tunicatum, a radicellis brevibus rigidis vestitâ ad soli sabulique frusta adhærentibus. Folium inferius basale 18–30 mm. diam., orbiculare vel late ovatum, membranaceum, basi subcordatum longe petiolatum, petiolo tenui, nervis 4–5-jugis patenti-arcuatis, psittaceo-viridulum. Caulis $2\frac{1}{2}$ –7 ctim., tenuis simplex, basi ascendens mox erectus. Folia caulina 2 superiora parva, cymam fere subtendentia, ovata, breviter petiolata, petiolis ciliatis, subtus leviter glaucescentia. Stipulæ foliaceæ exiguæ lineares acutæ ciliatæ. Cyma pedunculo firmo, 4–6 mm. longo, suffulta, floribus (1-vel) 2–6, breviter pedicellatis, pedicellis 12 mm. longis erectis. Bracteæ minuscule oblongæ. Calycis dentes triangulares attenuato-acutati, 3 acuminatis, 2 acutis, omnibus ciliolatis. Corollæ tubus calyce duplo longior, pilosulus, fauce intus glaber; limbi lobi acuti. Stylus basi urceolatus. Fructus 8 mm.—Floret Junio.

Syn.—*Ophiorrhiza nana* Edgew. in Trans. Linn. Soc. xx. 60 (1846).

HAB. On the south slope of the Central Himalayas, in the native feudatory state of Garhwal, and in the Almora district of the Kumaon division of the United Provinces. The plant flowers in the month of June, in the rainy season, and grows in the temperate region, being found in these two mountainous districts at 1200–2400 metres above sea-level. I have to thank Mr. J. F. Duthie and Mr. J. R. Drummond for their help in solving the geographical puzzles written on the labels of the specimens. There are four gatherings preserved in Kew Herbarium:—(1) The earliest, from herb. Royle, collected some time between 1826 and 1836 (identified and named by Sir J. D. Hooker). They are not actually referred to by Royle in his remarks on Rubiaceæ in the *Illustr. Bot. Himalaya*, pp. 237–241, where, however, he says, “During the moisture of the rainy season, some herbaceous Rubiaceæ make their appearance at 6000 and 7000 feet of elevation”; and it was probably at this level that the specimens were found. (2) Specimens from Garhwal (*Falconer* ex herb. E. Ind. Co.), probably gathered somewhat later than the preceding (distributed in 1864), as Falconer succeeded Royle as Curator of the Saharanpur Botanic Garden. (3) The type-specimens, on which the genus is founded, gathered at Hattu-pan in 1843, on damp limestone rocks, growing with Cyrtandraceous plants, at 1500–1800 metres (*Edgeworth*, n. 15). Mt. Hattu is a few miles west of Mussooree Sanatorium, in the native feudatory state of Garhwal. In Edgeworth’s original paper the locality is misprinted “Huthipeon.” Mr. Duthie tells me that Falconer’s specimens were collected near Mussooree, and that these three gatherings all probably came from the same small area. (4) Specimens from Mohargari, in the Almora district of Kumaon, gathered 1847–49, at 1200 metres above sea-level (*Strachey & Winterbottom*, n. 3), with drawings of analytical details by Hooker. Mr. Duthie also has specimens from another part of the same district of Kumaon, collected in 1885, and he says that it probably extends over a larger area than is here indicated, but that, being an insignificant plant, it would be readily passed over by collectors.

Neither Hattu-pan nor Mohargari is given in Hunter’s *Imperial*

Gazetteer of India (1881), or in Ritter's *Index*, or in any available map or chart. They are probably only the landmarks of mountain-huts.

The leaves are very thin in texture, and the upper pair are close under the flowers. In one capsule there were twenty-four-seeds; the contents of other capsules were lying loose in the envelope. The testa was crinkled from shrinking of the albumen, and the embryo was only faintly made out under the $\frac{1}{8}$ -inch power of a compound microscope. The specific name, though transferred from another genus, appropriately expresses the appearance of the plant.

Clarkella and *Argostemma* are readily distinguished from *Neurocalyx* by the entire (not fimbriate) stipules. The following salient characters serve to distinguish *Ophiorrhiza*, *Clarkella*, and *Argostemma* from one another:—

OPHIORRHIZA. Anthers free, spreading; fruit broadly and didymously obcordate, compressed, composed of two spreading lobes, loculicidal above the calyx; flowers secund on the branches of dichotomous cymes; embryo clavate, bilobed.

CLARKELLA. Anthers connivent, subconnected at the sides; fruit obconical, bilocular, indehiscent; flowers in a terminal bracteate cyme; style short, with two filiform arms; embryo clavate, bilobed.

ARGOSTEMMA. Anthers connivent or coherent; fruit bilocular, dehiscence by one or two terminal pores or valvular; flowers in pedunculate cymes or umbels; style filiform, with capitellate stigma; embryo ovoid, bifid, with denser albumen.

The plants to which the present species seems to be most nearly allied are *Argostemma humile* J. J. Bennett and *Argostemma Khasianum* C. B. Clarke, both of the Himalayan region.

ON THE JULIANIACEÆ, A NEW NATURAL ORDER.

BY W. BOTTING HEMSLEY, F.R.S., F.L.S.

[We have received from the author for publication the following abstract of an important paper communicated by him to the Royal Society.—ED. JOURN. BOT.]

I.—GENERAL DESCRIPTION.

The *Julaniaceæ* comprise, so far as at present known, two genera and five species. They are resiniferous, tortuously branched, deciduous, dioecious shrubs or small trees, having alternate, exstipulate, imparipinnate leaves, from about one to three decimetres long, clustered at the tips of the flowering branches and scattered along the short barren shoots. The flowers are small, green or yellow-green, quite inconspicuous, and the males are very different

from the females. The male inflorescence is a more or less densely branched axillary panicle or compound catkin, from $2\frac{1}{2}$ –15 cm. long, with weak, thread-like, hairy branches and pedicels. The male flowers are numerous, 3–5 mm. in diameter, and consist of a simple, very thin perianth, divided nearly to the base into four to nine narrow equal segments, and an equal number of stamens alternating with the segments. In structure and appearance they are almost exactly like those of the common oak. The female inflorescence is similar in structure to that of the sweet chestnut, consisting of an almost closed, usually five-toothed involucre, borne on a flattened pedicel and containing three or four collateral flowers, of which the two outside ones are, perhaps, always abortive.

At the flowering stage, the female inflorescences including the narrow flattened pedicel and the exserted styles, are about 2 cm. long, and, as they are seated close in the axils of the crowded leaves and of the same colour, they are easily overlooked. The female flowers are destitute of a perianth, and consist of a flattened, one-celled ovary, terminated by a trifid style and containing a solitary ovule. The ovule in both genera is a very peculiar structure. I will first describe that of *Juliania*. In the flowering stage it is a thin, flat, obliquely horseshoe-shaped or unequally two-lobed body, about 2 mm. in its greatest diameter, attached to the base of the cell. At a little later stage, in consequence of unequal growth, it is horizontally oblong, nearly as large as the mature seed, that is, 6–8 mm. long, and almost symmetrically two-lobed at the top. A vascular bundle or strand runs from the point of attachment to the placenta upwards near the margin into one of the lobes. In this lobe the embryo is tardily developed, and at this stage it is more or less enclosed in the opposite lobe, the relations of the two being as nozzle and socket to each other. It is assumed that the whole of this body, with the exception of the lobe in which the embryo is formed, is a funicle with a unilaterally developed appendage, which breaks up and is absorbed during the development of the ovule into seed. A similar growth and transformation is unknown to me in any other natural order.

The ovule of *Orthopterygium* is very imperfectly known, but the attachment appears to be lateral and the funicular appendage cup-shaped at the basal end, bilamellate upwards, and more or less enclosing the embryoniferous lobe. Mr. Boodle, who has fully examined the ovule of *Juliania* from microtome sections, describes it as hemianatropous with a single integument.

The compound fruits of *Juliania* are samaroid in form, the wing being the flattened pedicel, at the base of which it disarticulates from the undifferentiated part of the pedicel. They vary from 4–7 cm. in length by $1\frac{1}{2}$ – $2\frac{1}{2}$ cm. in width. Externally they strongly resemble the samaroid pods of certain genera of *Leguminosæ*, notably those of *Platypodium* and *Myroxylon*. The involucre itself, of the largest fruits seen, is only about 1 cm. deep by 2 cm. wide. It is composed of very hard tissues and is quite indehiscent. Only quite young fruit of *Orthopterygium* is known. In this the flattened

pedicel is narrow, straight, and equilateral, from 6–7 cm. long, and about 1 cm. wide.

The nuts of *Juliania* are almost orbicular, biconvex, hairy on the outside, and have a very hard endocarp. The solitary exalbuminous seed is circular or oblong, 6–10 mm. long, compressed, with a smooth, thin testa. The embryo is horizontal, with thin, plano-convex, more or less oblique, obscurely lobed cotyledons, which are epigæous in germination, and a long ascending radicle applied to the edges of the cotyledons.

II.—HISTORY.

It is surprising that a genus of plants so striking in aspect, so distinct in the shape of its fruit, and so widely spread as *Juliania* is in Mexico, should have entirely escaped the observation of all the earlier European travellers in that country.

C. J. W. Schiede, M.D., who accompanied Ferdinand Deppe on a botanical expedition to Mexico in 1828, was apparently the first to send dried specimens to Europe of one of the species of *Juliania*. But it was not until 1843 that his friend, Dr. D. F. L. von Schlechtendal, published an account of the genus of plants in question.

Under the name of *Hypopterygium* (subsequently *Juliania*) *adstringens*, he very fully described the material he had an opportunity of examining, but he had neither female flowers nor mature seeds, and he was doubtful whether the fruit was the result of one or more flowers. His description is very accurate, and he expresses his views of the affinities of the plant, which he regarded as the type of a new Natural Order. Since Schlechtendal's time, until I took up the study of the genus five years ago, nobody seems to have had sufficient material to supplement his description.

In 1854, A. Gray described, also from very incomplete material, what he considered a second species of the same genus, collected in Peru. An examination of fuller, though by no means complete, material has led me to separate it generically under the name of *Orthopterygium*.

In September, 1900, the late Mr. Marc Micheli presented Kew with a small set of E. Langlassé's Mexican plants. Among them was a specimen in fruit, which, after much research, was identified with Schlechtendal's *Juliania adstringens*; but the most careful and tedious examination carried me no further than Schlechtendal had reached sixty years before. Previous to this (in 1899, as I afterwards found out), Kew received a specimen of a male plant collected in the Mexican State of Jalisco by Mr. C. G. Pringle, n. 6871, and doubtfully named *Juliania adstringens*. The male specimen was published [*Icones Plantarum*, t. 2722] as *Juliania mollis* Hemsl., and the fruiting as *J. adstringens* Schl. [*op. cit.* t. 2723].

This publication had the desired effect, for it brought me a letter at the end of 1901 from Dr. J. N. Rose, Curator in the "Division of Plants" of the United States National Museum at Washington, from which I make the following extracts:—

"You will also be interested in what I have to tell you about *Juliania*. For more than six years I have been at work off and on at this genus, but for the lack of material I have never published anything upon it, but each time have brought back specimens, and this year was especially fortunate in collecting near the type-locality both male and female plants. In looking up the subject since my return, I find that you have anticipated me, and have published two very beautiful plates and some interesting notes. . . . There are, however, more than two species in Mexico. I have certainly four well-marked species and possibly six. . . . With regard to the position of this genus, I think it must be regarded as the type of a new order. I do not think it has any relationship to either *Burseraceæ* or *Anacardiaceæ*. My conclusions in the field were that it must be closely related to *Juglandaceæ*, a relationship which you also suggest."

In this communication Dr. Rose most generously offered to send all his specimens and notes to me, leaving it to my judgment in what form publication should be effected. I gladly accepted, and through the kindness of the Trustees of the Bentham Fund, Miss M. Smith made an elaborate series of drawings under my direction. As there were still some structural points on which we were not quite clear, and Dr. Rose contemplated another visit to Mexico, it was decided to publish at once a description of the genus as then understood, and brief diagnoses of the species.

III.—GEOGRAPHICAL DISTRIBUTION.

So far as at present known, *Juliania* is confined to Mexico, and the various species occur in isolated localities between about 17° 40' and 23° N. lat., and 97° and 104° W. long., and at altitudes of about 1500 to 5500 ft.

The habitat of the Peruvian *Orthopterygium Huanucui* is 2000 miles distant from the nearest locality of any species of *Juliania*. The exact position of the only place in which it has been found cannot be given, but it is in the Province of Canta, in the Department of Lima, between 11° and 12° S. lat.

IV.—THE AFFINITIES OF THE JULIANIACEÆ.

During the six years that I have had this small group under observation I have had opportunities of showing the specimens and drawings to many of the leading botanists of the world, and all agree who have seen them that it deserves to rank as an independent order. That being so, the question of its position arises, but that is a point not so easily settled in a linear arrangement. Taking the morphological characters *seriatim*, it is evident that the closest relationships are with the *Anacardiaceæ* and *Cupuliferæ*. The absolute separation of the sexes and the very great diversity of the floral structure of the sexes, associated with pinnate leaves, offers a combination of characters probably without a parallel.

Beginning with the foliage, the *Julianiaceæ* have alternate, exstipulate, imparipinnate leaves in common with at least eight

different ligneous orders, but here the affinity, or, rather, resemblance, ends so far as six of them are concerned, and the comparisons need be carried no further. There remain the *Anacardiaceæ* and *Juglandaceæ*, both of which are also resiniferous, both have unisexual flowers with reduced envelopes, at least as to some of their members, and both have solitary, exalbuminous seeds. Other points of resemblance or similarity in the *Juglandaceæ* are the dissimilar male and female flowers, the broad, stigmatic lobes of the style, and the single-coated ovules. *Juglans* has also a funicle of unusual development. But the combined characters in common of the *Julianiaceæ* and the *Juglandaceæ* cannot be regarded as constituting a close affinity. In some respects there is a nearer relationship to the *Anacardiaceæ*. The anatomical characters of the two orders are very much alike; but as Dr. F. E. Fritsch will describe and discuss the anatomy in a separate paper, it is unnecessary to enter into particulars here.

The nearest approach I have found to the singular funicular development of the ovule is in the *Anacardiaceæ*, but the resemblance is remote, and the ovules of the latter are double coated. Coming to the seed and embryo, however, the resemblance is complete, and, apart from the slight obliquity of the cotyledons of *Juliania*, the description of the seed and embryo of *Cotinus* or *Rhus* would do for *Juliania*. With this the affinities to the *Anacardiaceæ* are exhausted, and they are not sufficiently strong to justify the juxtaposition of the two orders. The next comparison is with the *Cupuliferæ*, taking the order as limited by Bentham and Hooker. There is nothing in the secretions nor in the foliage to warrant an approximation of the two orders, and in habit of growth the *Julianiaceæ* are very different. But divergences as great, or greater, exist between closely associated orders, and even between genera referred to the same order: and when we come to the inflorescence and flowers, affinities are evident; that is, if affinities are deducible from similarities in structure.

The male inflorescence, the male flowers, and the pollen of *Juliania adstringens* are so near in texture, structure, and form to the same parts in certain species of oak that, detached, they might be referred to the genus *Quercus*. In fact, there is much greater dissimilarity in the male inflorescence and flowers of different species of *Quercus* than there is between those of *Juliania* and those species of *Quercus* which have a flaccid male inflorescence and stamens alternating with the segments of the perianth.

The female inflorescence and the male flowers of *Juliania* are not represented by exact counterparts in the *Cupuliferæ*, but the analogies are perhaps greater than with any other order. Several female flowers in a closed involucre is a characteristic of *Juliania*, of *Fagus*, *Castanea*, and *Castanopsis*. In all three of the genera of the *Cupuliferæ* named, the involucre dehisces regularly or irregularly, and the nuts fall out. In *Juliania* the involucre is indehiscent, and the flattened nuts are adnate by their edges to the inner wall of the involucre, and they have a very hard, relatively thick, sclerenchymatous pericarp.

Going back to the flowers, the male of *Juliania* has a perianth; the female, none. In *Corylus* the conditions are reversed; in *Betula*, neither sex has an obvious perianth; in *Quercus*, the flowers of both sexes are furnished with a perianth.

All of the *Cupuliferæ* have an ovary which is more than one-celled, and usually there are three cells, and mostly more than one ovule in each cell, though each nut is usually only one-seeded. The ovary of *Juliania* and of *Orthopterygium* invariably contains only one ovule. The flowers and nuts of *Castanea* are collateral, as in *Juliania*. The seeds of both orders are exalbuminous, and the cotyledons are epigæous in germination.

Weighing the characters in which there is agreement or similarity between the *Julianiaceæ* and the *Anacardiaceæ*, and those in which there is agreement or similarity between the *Julianiaceæ* and the *Cupuliferæ*, the latter in my estimation preponderate; and I cannot suggest a more natural position for the *Julianiaceæ*, in a linear arrangement, than between the *Juglandaceæ* and the *Cupuliferæ*.

BIBLIOGRAPHICAL NOTES.

XL.—ATLAS DER DIATOMACEEN-KUNDE. HERAUSGEGEBEN VON A. SCHMIDT.

SINCE some uncertainty attaches to the dates of issue, especially of the earlier parts, the following notes may be of service to those consulting the work.

It has been issued in Hefte, each containing four plates. With the first 20 hft. a single folio of *Vorläufige Erläuterungen* was issued, and of this text a second edition appeared for hft. 1-7, 11 and 12. On this second issue the dates of first publication, save those of hft. 1 and 4, are mentioned. This preliminary text was superseded in the first 20 hft. (pls. 1-80) by *Erläuterungen*, consisting of a single folio for each plate, that were issued with a second edition of the plates. This fresh text also gives what purports to be the dates of first issue, but these are in some cases manifestly erroneous.

This *Revidirter Text* was also published without the plates for the benefit of former subscribers (*Naturæ Novitates*, May, 1887, p. 121).

With hft. 21 (pl. 81) began the custom, still continued, of issuing a single folio of *Vorläufige Erläuterungen* with each plate.

Two indexes to the names of the species (*Verzeichniss*, &c.) have been issued. One to plates 1-144 (Series I-III) in 1890, and a second to plates 1-240 (Series I-V) in 1902.

		'Vorläufige Erläuterungen' (1 fol. with each Heft).			'Erläuterungen' (1 fol. to each Plate).			Issue of the 'Verbes- serter Abdruck' cited in the 'Naturæ Novitates.'
		Plates.	Date of first publi- cation as given on the second.	Date of second publication.	Plates.	Date of first as given on the 'Ver- besserter Abdruck.'	Dates of 'Verbesserte Abdruck.'	
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	5	"	17-20	25, vi. 75	1, xi. 78	17-20	July '85	Dec. 1885, p. 276.
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	8	"	29-32	" " "	[No	29, 30	1, ix. 85	
	9	"	33-36	1, vii. 76	second	31, 32	1, xii. 85	May, 1886, p. 117.
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					45-48	15, xii. 76	1, v. 86	
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	27, 28	"	105-112	1, xi. 86				
	29, 30	"	113-120	[N. D.]	Jan. 1887, p. 15.			
	31, 32	"	121-128	1, viii. 88	Ap. 1888, p. 116.			
	33, 34	"	129-136	[N. D.]	Aug. 1888, p. 271.			
	35, 36	"	137-144	[N. D.]	Nov. 1888, p. 363.			
					[Not recorded 1889 ?]			

SERIES IV.		Plates.	'Vorläufige Erläuterun- gen.' Dated.	Date of receipt in Bot. Dept.	Issue recorded in 'Naturæ Novitates.'	
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47	"	185-188	15, x. 93		Nov. 1893, 479.	
48	"	189-192	[N. D.]	29, ix. 94	Sept. 1894, 433.	
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50	"	197-200	"	13, iv. 95	Ap. 1895, 192.	
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54	Bearbeitet von M. Schmidt.	213-216	"	8, iii. 99	Mar. 1899, 196.	
55	" " F. Fricke.	217-220	"	14, xi. 99	Nov. 1899, 679.	
56	" " M. Schmidt.	221-224	Nov. 1900	4, xii. 1900	Dec. 1900, 577.	
57	} Bearbeitet von M. Schmidt. (Herausgegeben von F. Fricke.)	225-228	Sept. 1901	24, ix. 01	Oct. 1901, 532.	
58		229-232	Ap. 1902	3, vi. 02	July, 1902, 379.	
59, 60		233-240	Oct. 1902	28, x. 02	Nov. 1902, 630.	
SERIES VI. Bearbeitet von M. Schmidt.						
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{ 62 }	{ " " O. Müller.	245, 246	Mar. 1904	19, iv. 04	May, 1904, 331.	
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{ 65 }		" " H. Heiden.	257-260	Sept. 1905		

B. B. WOODWARD.

OXALIS CORNICULATA AND ITS ALLIES.

By B. L. ROBINSON.

IN the spring of 1905, while examining at the Gray Herbarium the yellow-petaled species of *Oxalis*, the writer was struck by the fact that European botanists, who have worked critically on the group, have given but slight attention to the American forms, and that in recent American revisions there had been quite as little effort to correlate the species which occur upon the two continents. This observation led to an examination of the European material, with an effort to learn in how far it exhibited the same distinctions which in recent years have been clearly pointed out chiefly through work of Dr. J. K. Small for the American forms. When thus studied the specimens quickly suggested some interesting identities, but the European material available at that time was neither sufficiently abundant nor authoritative to permit definite conclusions. However, during the following summer the writer had opportunities to examine a much greater amount of material in several of the leading European herbaria, especially at the British Museum of Natural History, where, with the kind aid of Messrs. Britten and

Baker, the subject was again taken up. The chief difficulties encountered arose not so much from the plants themselves, as in the unravelling of the tangled synonymy, and in determining the precise application of the Linnæan *O. corniculata* and *O. stricta*, species founded on mixed material, and subject to much confusion from the time of their first publication. Several allied species, well described by Dr. Small, appear to be confined to North America, and need not be considered at this time. Of species common to Europe and North America there are three, which may be distinguished readily by the following salient characters. Until the traits and distribution of these have been well noted it is impossible to proceed intelligently to the consideration of their nomenclatorial history, or to see what names they should logically bear.

SPECIES no. 1. Main stems prostrate, regularly rooting at the nodes, but destitute of basal filiform subterranean runners; fertile branches short, suberect, mostly 3 to 7 cm. high; inflorescences mostly 1-2-flowered; pedicels usually deflexed in fruit.—Widely distributed in the warmer parts of Europe, Asia, Africa, and America, occurring naturally in Italy, Spain, and Florida; likewise found in cooler regions of Europe and America as a frequent weed in greenhouses.

SPECIES no. 2. Bright or yellowish green; main stem erect, decumbent, or at length reclining, not rooting at the nodes except rarely at the decumbent base; soon developing filiform subterranean stolons; inflorescences 2-7-flowered, at first umbelliform, but in well-grown individuals becoming cymose; petioles, peduncles, and pedicels covered with a fine widely spreading pubescence.

SPECIES no. 3. Pale or greyish green, mostly decumbent, but neither rooting at the nodes (except very near the base) nor stoloniferous; inflorescences chiefly 2-flowered, both pedicels turned toward the same side, and deflexed in fruit; petioles, peduncles, and pedicels covered with a fine grey appressed pubescence.—Common, widely distributed, and clearly indigenous in the United States; occurring also as a rarer plant in portions of England, the Channel Islands, and France, and perhaps elsewhere on the Continent.

Bearing in mind the nature of these three plants, we may proceed to the interpretation of the Linnæan species, which were described in the first edition of the *Species Plantarum*, i. 435 (1753) as follows:—

11. *OXALIS* caule ramoso diffuso, pedunculis umbelliferis. *Hort. cliff.* 175. *Hort. ups.* 116. *Roy. lugdb.* 458. *Sauv. monsp.* 173. *Gort. gelr.* 91. *corniculata*.
Oxys flavo flore. *Clus. hist.* 2, p. 249.
Trifolium acetosum corniculatum. *Bauh. pin.* 330. *luteum minus repens et jam procumbens.* *Moris. hist.* 2, p. 183, s. 2, t. 17, f. 2.
Habitat in Italia, Sicilia. ☉
Confer. *Oxalis lutea annua, floribus dentatis.*
Few. per. 3, p. 49, t. 24.

12. *Oxalis* caule ramoso erecto, pedunculis umbelliferis. *Gron. virg.* 161 *stricta*.
Oxys americana erectior. *Tournef. inst.* 80 [88].
Trifolium acetosum corniculatum luteum majus rectum indicum s. virgineum. *Moris. hist.* 2, p. 184, s. 2, t. 17, f. 3.
Habitat in Virginia.

An examination of some extant specimens, as well as the pre-Linnæan literature and figures, shows clearly that Linnæus confused under each of these specific heads at least two plants. If attention be directed, in the first place, to his *O. corniculata*, it may be noticed that there is still preserved at the British Museum a specimen of the plant from the *Hortus Cliffortianus*, which exhibits the several-flowered (in the young state umbelliform) inflorescence of our species no. 2, with which, in all other respects also, this specimen is in entire agreement. This shows that the first mentioned plant under *O. corniculata* was the common and widely distributed species, which is readily identifiable by its filiform stolons.* On the other hand, it is equally evident, from an examination of the figures of Clusius, Lobelius, and Morison, that they had before them the creeping prostrate-stemmed plant which we have called no. 1. This element, as we have seen, is common in Southern Europe, and in this connection it is of interest to notice the Linnæan habitat, Italy and Sicily.

To pass now to *O. stricta*, it will be seen that the first reference is to Gronovius, whose plant was collected by Clayton in Virginia. Happily this plant of Clayton (no. 474) is still preserved in the British Museum, and is unmistakably our no. 3, with appressed pubescence and geminate pedicels deflexed in fruit. The second reference in the Linnæan description of *O. stricta*, namely, to the *Institutiones* of Tournefort, is of little or no importance; for Tournefort merely refers back to Morison, and there is no evidence that he had personally seen the plant which he was calling *Oxys americana erectior*. Morison's figure (3), on the other hand, is decidedly interesting, since, notwithstanding its obvious crudeness and inconsistency, exhibiting impossible pendulous capsules, it shows clearly a young 5-flowered cymose inflorescence, which can be identified only with our no. 2.

It is thus evident that both of the Linnæan species were composite, and that while *O. corniculata* rests upon our species nos. 1 and 2, *O. stricta* involves both nos. 2 and 3. In determining which of these names to apply to particular plants, we are brought face to face with one of the most serious questions of modern classification, namely, the relative validity of types. On this subject there has never been any detailed or conclusive international ruling, and it is much to be regretted that, although the American representatives,

* It may be noted that Linnæus, in the *Hortus Cliffortianus*, describes the inflorescences of this plant as multiflorous, which is an added proof that the plant he had in mind was not the creeping species, which habitually has 1-2-flowered peduncles.

both radical and conservative, were inclined to urge the importance of legislation on this matter during the recent Congress at Vienna, no action leading to a definite solution of the problem was taken. We are still in the dark as to which of several elements described as a species shall in subsequent segregation retain the old name. Practices in such cases always have been, and still are, widely divergent. The general principle, that the most characteristic part of a group which is to be divided shall continue to bear the original name is often so vague in its application as to bring about no agreement whatever. Of this fact, the yellow-petaled species of *Oxalis* furnish a drastic example. Their distinctions have been clearly grasped by several careful and discriminating writers—as, for example, Jacquin, Jordan, Trelease, and Small—yet no two of these authors have agreed as to the way in which the names should be applied. It is certainly to be hoped that the rulings made at Vienna—in most respects admirable—may be supplemented during the proposed Congress at Brussels by some definite decisions regarding the relative validity of types.

In the meantime it is necessary to make use of such general principles as have been locally practised by those who have given the subject careful thought, and have aimed to be consistent. Of these principles there are at least two which possess a reasonable definiteness—(1) the principle of priority of position, according to which the first-mentioned type determines the application of the name; and (2) the principle of residues, according to which a subsequent author may remove any portion of a species or other composite group, the remainder being left to bear the original name. Without committing ourselves regarding the relative merits of these two divergent principles, we may profitably apply each to the small group in hand, and see what the results will be.

According to the principle of priority of position, *O. corniculata* L. must rest upon the plant of the *Hortus Cliffortianus*, which, as stated above, is our species no. 2; and *O. stricta* L. must rest upon the plant of Clayton, which is our species no. 3. Finally, the creeping plant (no. 1), which formed the non-typical part of the Linnæan *O. corniculata*, must receive its earliest subsequent name. This appears to be *O. repens* Thunb. Oxal. 14 (1781).

If, on the other hand, the principle of residue is applied, the process is as follows: *O. corniculata* L. appears to have stood as a composite species until the publication of Thunberg, mentioned above. At that time (1781) the creeping plant (our species no. 1) was taken out, and independently described as *O. repens*, which leaves the Linnæan name *O. corniculata* to stand for the stoloniferous plant (our species no. 2). When the name *corniculata* has thus been applied to no. 2, it is evident that the Linnæan name *O. stricta*, originally applied to nos. 2 and 3, can rest only upon no. 3.

Thus by a curious and very happy coincidence the two different methods lead in this group by diverse paths to identical results. The three species under discussion may therefore be collated, with their leading synonymy, as follows:—

O. CORNICULATA L. Stoloniferous; stem not creeping; inflorescence 2-7-flowered, at first umbelliform, at length more or less distinctly cymose; fruiting pedicels ascending; pubescence spreading.—L. Spec. Pl. i. 435 (1753), as to pl. Hort. Cliff., &c. *Oxys lutea Americana erectior* Dill. Hort. Elth. ii. 299, t. 221, f. 288, as to detail fig. no. 4. *Oxalis ambigua* Salisb. in Trans. Linn. Soc. ii. 242, t. 23, f. 4 (1794), presumably as to pl. but not as to syn. *O. stricta* of most European authors, e. g. A. Br. in Flora, 1822, p. 691 (1822); Reichenb. Ic. Fl. Germ. f. 4895 (1841); Koch, Taschenb. 108 (1844); Kirschleger, Fl. d'Als. 133 (1852); Boreau, Fl. du Centre de Fr. ed. 3, ii. 135 (1857); Wagn. Ill. Deutsch. Fl. 154 (1871); Syme, Eng. Bot. ii. 214, t. 312 (1873); Hook. f. Stud. Fl. Brit. Isl. ed. 3, 84 (1884); Aschers. & Graebn. Fl. Nordostd. Flachl. 461 (1898); Garcke, Ill. Fl. Deutschl. ed. 19, 126 (1903); and many others. *O. europæa* Jord. in F. W. Schultz, Archiv. Fl. Fr. et Allem. 309, and in Billot, Annot. Fl. Fr. et Allem. 20 (1855). *O. cymosa* Small, Bull. Torr. Bot. Club, xxiii. 267 (1896).—The commonest species of Continental Europe, the British Isles, and the eastern half of the United States. It is very difficult to tell the native country of this plant. There is a general impression, expressed by several of the writers cited above, that in Europe the species is an immigrant from America. Kirschleger, *l. c.*, even expresses the opinion that it reached Alsace (where now abundant) after the beginning of the nineteenth century. Jordan seems to be alone in maintaining that the species is indigenous in Europe. Most authors speak of it as a weed of gardens and cultivated fields. Curiously enough, this is precisely the case in North America, where it occurs almost exclusively in soil which has been artificially loosened or cleared of the indigenous vegetation. In this respect it acts exactly like *Capsella Bursa-pastoris* and similar plants of Old World origin.

O. STRICTA L. Greyish green, creeping only at the base or not at all, not stoloniferous; main stems decumbent or suberect; inflorescences chiefly 2-flowered; pedicels turned to one side and deflexed in fruit; pubescence, especially that of the peduncles and pedicels, appressed.—L. Spec. Pl. i. 435 (1753), as to pl. of Clayton; Small in Bull. Torr. Bot. Club, xxiii. 267 (1896). *Oxys lutea Americana, humilior et annua* Dill. Hort. Elth. 298, t. 221, f. 288. *Oxalis Dillenii* Jacq. Oxal. 28 (1794). *O. ambigua* Salisb. in Trans. Linn. Soc. ii. 242, as to syn. *O. Navieri* Jord. in F. W. Schultz, Archiv. Fl. Fr. et Allem. 310, and in Billot, Annot. Fl. Fr. et Allem. 20 (1855); Boreau, Fl. du Centre de Fr. ed. 3, ii. 135 (1857). *O. corniculata* Sm. Eng. Bot. t. 1726, and Syme, Eng. Bot. ii. 213, t. 311 (1873); Hook. f. Stud. Fl. Brit. Isl. ed. 3, 84 (1884); Trel. in Mem. Bost. Soc. Nat. Hist. iv. 88 (1887), in great part. *O. corniculata* var. *Dillenii* Trel. in Gray, Syn. Fl. N. A. i. pt. i. 365 (1897).—Throughout North America, from Southern Maine to Southern British Columbia, and southward to the Gulf of Mexico; indigenous, at least in the southern part of this range. It occurs also in South-western England, several specimens having been seen from Devonshire. Its occurrence in Jersey is shown by

an excellent and highly characteristic specimen "ex herb. Christy," now in the Gray Herbarium, and by another collected by Dr. Jermyn, "ex herb. W. W. Newbould," at the British Museum. From France the following specimens have been examined:—Pont de Lussac, Vienne, labelled *O. Navieri* in hand of Jordan himself; no. 841 of F. Schultz's Herb. Norm. Cent. 9, the label of which reads, "Champs et lieux cultivés sur l'alluvium aux bords de la Vienne au pont de Lussac le Château (Vienne). Déc. et rec. T. Chaboisseau"; no. 841 *bis* of the same series, "Lieux cultivés et incultes dans la commune d'Isle près de Limoges (Haute-Vienne)"; and no. 2645 of Billot's Fl. Gall. et Germ. exsicc., "Se reproduisant spontanément dans un jardin à Besançon (Doubs)." The wide distribution of this species in America (where obviously indigenous), its limited occurrence in Europe, and especially the nature of its habitat, as given in the French exsiccatae, render it probable that it is of American origin, and merely introduced in Europe.

O. REPENS Thunb. Main stems prostrate, rooting at the nodes and extensively creeping; floriferous branches short, erect; no subterranean stolons; inflorescences mostly 1-2-flowered; pedicels usually deflexed in fruit.—Thunb. Oxal. 16 (1781); Jacq. Oxal. 32, t. 78, f. 1 (1794). *O. corniculata* L. Spec. Pl. i. 435 (1753), as to creeping pl. figured by Clusius, Bauhin, Morison, &c.; Jacq. Oxal. 30, t. 5 (1794), and most European and recent American authors, *e.g.* A. Br. in Flora, 1822, p. 690 (1822); Reichenb. Ic. Fl. Germ. f. 4896 (1841); Koch, Taschenb. 108 (1844); Jord. in Billot, Annot. Fl. Fr. et Allem. 19 (1855); Boreau, Fl. du Centre de Fr. ed. 3, ii. 135 (1857); Wagn. Ill. Deutsch. Fl. 154, f. 232 (1871); Garcke, Ill. Fl. Deutschl. ed. 19, 126 (1903). *O. pusilla* Salisb. in Trans. Linn. Soc. ii. 243, t. 23, f. 5 (1794). Probably *O. herpestica* Schlecht. Linnæa, xxvii. 525 (1854), ex char.—Of wide distribution in tropical and subtropical regions of both the eastern and western hemispheres, growing without protection in Southern Europe and some parts of the Southern United States, but found in cooler climates chiefly as a weed in greenhouses. Specimens have been examined from the Mediterranean Region, the Canary Islands, South Africa, British India, China, and several of the Pacific Islands, as well as from various parts of the United States.

By way of summary, it may be said that a consistent interpretation of the Linnæan types (whether we follow, on the one hand, the principle of residues, or admit, on the other, the value of priority of position) shows that the "*Oxalis stricta*" and "*O. corniculata*" of English authors should be reversed, that the continental "*O. stricta*" should be *O. corniculata*, that the continental "*O. corniculata*" should be *O. repens*, and, finally, that the true *O. stricta*, indigenous and widely distributed in North America, occurs in South-western England, on the Channel Islands, and in Central and Eastern France, where it has been passing as *O. Navieri*. The writer shares any regret which may be felt regarding the necessity of so much change in current and long-established usage, but sees no way of avoiding it without an arbitrary and inconsistent treatment of the species concerned.

SHORT NOTES.

SPREAD OF *SPARTINA TOWNSENDI*.—In the notes on this grass extracted from the *Botanical Exchange Club Report for 1905* (p. 356, *supra*), it is assumed that its occurrence by the Fever Hospital, Poole, is a new record for Dorset. This is not the case. It was gathered by the late Mr. J. C. Mansel-Pleydell in 1899 near Owre, on the south side of Poole Harbour, and reported for that locality in my *Flora of Bournemouth* (p. 246) in 1900. I had often looked for it at Poole Harbour, and can assert that it had not reached the little peninsula on which the Fever Hospital stands in 1901. With regard to Hants, I found the *Spartina* in Mr. Melvill's locality between Milford and Hurst Castle in 1900 fairly established; just too late for insertion in the *Flora of Bournemouth*. It is given, however, in the *Flora of Hants* (ed. 2, p. 479). It was probably then rather a recent arrival, as I think it was also at Lymington when discovered there by the Rev. W. R. Linton and myself in 1893. It was much better established that same year near Yarmouth (*B. F. C. Report*, 1893, pp. 427, 430), where many clumps occurred about Norton's Spit, on both sides of the causeway. Two years later, Mr. F. Stratton reported it from "little creeks on the west side of the River Medina" (see *Journ. Bot.* 1895, pp. 315 and 352; on the latter page, for *Spartina stricta* read *S. Townsendi*). Since the evidence goes to show that this species has been arriving in recent years in Poole Harbour, near Milford, and probably at Lymington, it is quite possible that the Isle of Wight stations are of comparatively modern date.—EDWARD F. LINTON.

EUPHRASIAS OF THE THIRLMERE DISTRICT.—During the first three weeks of August of this year the following Euphrasias were met with in the immediate vicinity of Thirlmere:—*E. borealis* Towns., *E. brevipila* Burm. & Gren., *E. curta* Wetts., *E. gracilis* Fries, *E. scotica* Wetts., and *E. Rostkoviana* Hayne. All these occurred on the Cumberland side of Dunmail Raise. On the Westmoreland side were found *E. borealis* Towns., and *E. scotica* Wetts. We are indebted to the Revs. W. R. Linton and E. S. Marshall for kindly examining our specimens and confirming our naming.—E. and H. DRABBLE.

JUNCUS TENUIS Willd. IN CUMBERLAND.—In August of this year *Juncus tenuis* was found growing abundantly by the roadside on the east side of Thirlmere. Its close neighbours were *J. acutiflorus* Ehrh., *J. lamprocarpus* Ehrh., *J. bufonius* L., *Epilobium obscurum* Schreb., *E. palustre* L., *Athyrium Filix-fœmina* Roth. It had all the appearance of being a native plant, but its position by the side of a comparatively newly-made road is very suspicious. The same road yielded two good plants of *Potentilla norvegica* L.—E. and H. DRABBLE.

VIOLA CARPATICA Borbas IN DERBYSHIRE. — In August, 1902, several specimens of a pansy evidently belonging to the *saxatilis* group, were found near Eyam in Derbyshire. They were growing

on the Carboniferous Limestone at the edge of a field, some nine hundred feet above sea-level. Examination has proved the plant to be *Viola carpatica* Borbas. It agrees in every particular with a plant from Lancashire in the National Herbarium, named by Professor Borbas himself. Mr. E. G. Baker fully agrees with this naming. This is the first time the plant has been recorded from Derbyshire. Growing with these plants was another, which agrees very closely with an authentic specimen of *V. lepida* Jordan. I am strongly inclined to believe that there is no constant difference between the two forms.—ERIC DRABBLE.

JUBULA HUTCHINSIÆ Dum.—On September 22nd some of the Public Botanical Walk Party (led by Mr. W. P. Hiern) found in the Hollow Brook, on Martinhoe cliffs, an hepatic new to us. I sent it to Mr. Macvicar for identification, and he states it to be the above-named plant, "one of the rarer Atlantic species." The interest of the "find" is enhanced by the fact of the following record from a manuscript list of North Devon hepatics collected by him, sent to me by late William Mitten shortly before his death:—"Frullania Hutchinsiae Hook. In the Lynn where water flows over a rock. Holly Brook, on stones, 1875." This is the first record of it, since the spelling "Holly," instead of "Hollow," Brook is evidently merely due to the vagueness with which a local name would be recalled after the lapse of thirty-one years, or to not exactly catching it by the ear at the time. It is clear that Mitten's "find" was at the identical place of that of our party.—C. E. LARTER.

AGROSTIS STOLONIFERA VAR. ARMATA Celak. — In July last my friend Mr. J. F. Rayner sent me an interesting form or variety of *Agrostis alba* having prominent awns which greatly exceeded the glume. He found this grass growing as a weed in his garden at Southampton. Professor Hackel, to whom I sent a specimen, writes that it is *Agrostis alba* var. *armata* Hack. ined., *A. stolonifera* var. *armata* Celak., adding that "it is well characterized by its long awn emerging from the middle of the flowering glume, or a little higher." Dr. Celakovsky describes the variety in Sitz. Bericht. K. Bohm. Gesellsch. Wissenschaft. Prague (1887, p. 178), where, under *A. stolonifera*, he mentions three varieties. Two of these have quite short awns. The plant can perhaps be hardly considered as a native in England, as it has so far only been found in cultivated ground. This seems to be the first record for its occurrence in Britain.—A. BRUCE JACKSON.

POLYGONUM AMPLEXICAULE Don, AND OTHER ALIENS.—In September last Mr. G. Chester, of Kettering, sent me several plants collected in that neighbourhood, mostly of the nature of casuals. Among them was a handsome *Polygonum*, with a deep rose-crimson flower, clearly allied to *P. Bistorta* L., but different in appearance, especially in the colour of the flower, the long, slender styles, and the leaves, the radical deeply cordate at base with the lamina in no way decurrent on the petiole, the upper also cordate, sessile and

amplexicaul, more tapering at the points than in *P. Bistorta*, besides other minor differences. I took it to the British Museum Herbarium, and, with the help of Mr. E. G. Baker, found it to agree most closely with *amplexicaule* Don; and subsequent dissection of the flower entirely confirmed the identification. The styles in *P. amplexicaule* are long and much exerted beyond the perianth, flexuose and tapering, only very minutely capitate; in *P. Bistorta* they are shorter, more rigid and stouter, distinctly capitate. In its vegetative characters *P. amplexicaule* varies considerably, as do the flowers also, the spike being sometimes dense, sometimes much elongated with distant flowers, which in that case are usually paler. Mr. Chester's specimens, which came from Finedon, Northants, show a stout-growing plant with robust habit and large deeply coloured flowers, and appear to belong to var. *speciosum* Hook. fil. (*P. speciosum* Wall.). Mr. Chester informs me that several plants grow in a rather damp meadow near a brook, and others in Finedon Hall grounds, the recent owner of which was a great collector of plants, and this may probably explain the origin of the specimens in question. *P. amplexicaule* is a native of the Himalayas, and it appears from Mr. Dunn's *Alien Flora* that it has not hitherto been noticed in this country. It is rather curious, considering its origin, that, as Mr. Chester tells me, the least frost is sufficient to cut the leaves and flowers. In addition to the above, Mr. Chester sent *Asperula arvensis* from near Kettering, together with *Reseda alba*, *Linaria purpurea*, &c. In 1894 I gathered a *Potentilla* by the roadside at Malvern Wells, which has been identified as *P. recta* L. A second specimen, gathered by Miss Doris Jones, at Duston, Northants, differs from the typical *P. recta* in having the whole plant covered with long silky hairs, while the upper part of the plant was not at all glandular. In these characters it came near *P. hirta* L., but the incision of the leaflets was quite characteristic of *P. recta*, with which I believe *P. hirta* is now usually united.—H. N. DIXON.

ISLE OF WIGHT PLANTS.—The following plants were observed by me in the autumn of 1905:—*Hypericum Androsæmum* L., near Wroxton. *Lathyrus pratensis* L. var. *villosa*, St. Lawrence. *Rubus Lindleyanus* Lees, Apes Down. *Rosa Eglanteria* L., near Apes Down. *R. systyla* Bast., between Apes Down and Newport. **Matricaria discoidea* L., near Apes Down Farm, and by the shore at Newport. *Cnicus acaulis* Willd., a variety of this or possibly a hybrid, with a stem about twenty inches high, and slender graceful habit, occurred on the borders of Apes Down. **Picris hieracioides* L. var. *gracilis* (Jord.), on Apes Down, also near St. Lawrence. *Euphrasia Kernerii* Wettst., near St. Lawrence. *Mentha rubra* Sm., by a farm near Whitwell. *Stachys ambigua* Sm., near Whitwell. *Origanum vulgare* L. var. *album*, at Rowledge in considerable quantity, and evidently hybridizing with the normal coloured plant, as a few scattered patches of intermediate-coloured plants were growing with this and the type. *Typha angustifolia* L., near Newport. *Sparganium erectum* L., *Potamogeton natans* L., *Juncus supinus* Moench., Brading. *Agrostis alba* L. var. *stolonifera*, near

Ventnor. *Hordeum nodosum* L., Brading, with a viviparous form. The plants marked * were when found new to the island, though I see that Mr. Stratton has found the *Matricaria* this year (Journ. Bot. 1906, 358).—G. CLARIDGE DRUCE.

BRISTOL PLANTS.—In connection with Mr. White's "Flora of the Bristol Coalfield" and subsequent papers in this Journal on Bristol plants, the following notes may be of interest:—*Erophila brachycarpa* Jord., which is omitted from the Flora, occurs abundantly (in several places) on Clifton Down. Specimens collected in April, 1903, and submitted to the Rev. E. S. Marshall, were returned, "good *brachycarpa* Jord."—*Trigonella purpurascens* Lam. This species is only mentioned in the Flora as included in a list of St. Vincent's Rock plants for 1789, but is reported to have been found on Brandon Hill in 1893. In my herbarium is a specimen from the Clifton Observatory, dated June, 1886, and another collected in the same spot thirteen years later, thus confirming a very old record.—*Sherardia arvensis* L. A curiously minute form of this species, which might repay further investigation, was growing in some quantity on a steep turfy slope of St. Vincent's Rock in May, 1885. The whole plant, which is unbranched and furnished with but two or three whorls of leaves, does not exceed 15 mm. in height, and it was only when sitting on the ground that the tiny pink flowers attracted my notice. — *Scilla autumnalis* L. This is stated in the Flora to have disappeared from St. Vincent's Rock since about 1860. A few plants in flower came under my observation at the end of August, 1894, on a slope above the railway station (probably Lightfoot's locality), and presumably may still be found there.—H. W. PUGSLEY.

CARDIGAN PLANTS.—While on a short holiday at Aberystwyth in June of last year, I met with some quantity of *Drosera anglica* Huds., and a few plants of *Orchis incarnata* L., on the bog at Borth; and by the stream below the Devil's Bridge a tuft or two of *Carex pallescens* L. I believe these three species have not hitherto been recorded for county Cardigan.—H. W. PUGSLEY.

HYPOCHÆRIS GLABRA L.—The Exchange Club Report for this year remarks (see Journ. Bot. 1906, 304) on the diminishing frequency of *Pyrola rotundifolia* L. β *arenaria* Koch in South Lancashire, and the danger of its extermination at no distant date. Another plant which is threatened with the same fate is *Hypochaeris glabra* L.; this plant grows nearer to the sea, upon the looser sand, and the danger lies rather in the extension of the golf-links than in building. Both were found in abundance near Freshfield, South Lancashire, in September of this year.—ERIC DRABBLE.

CHESHIRE PLANTS.—On Oct. 14th I received from Mr. Dunlop, of the Warrington Museum, a plant for identification. To my surprise the plant was *Herniaria hirsuta* L. It was found on the banks of the Bridgewater Canal, near Thelwall, in Cheshire. A specimen was sent to Mr. E. G. Baker, who confirmed my naming, and kept the specimen for the British Museum Herbarium. I have

also received from Mr. Dunlop, from Acton Grange, a *Galeopsis*, which proved to be *G. dubia* Leers. The plant was growing freely in a potato-field in soil overlying the Bunter Sandstone. I believe that this constitutes a new record for Cheshire.—ERIC DRABBLE.

GOODYERA REPENS. — In the *Kew Bulletin*, No. 7, 1906, Mr. Hemsley announces the "discovery" of this plant in Norfolk, in a pine-wood near Holt, in the north of the county. This locality is probably identical with that of Bodham recorded in this Journal for 1902, p. 325, whence specimens were sent by Mr. F. J. Spurrell to the National Herbarium. Mr. Spurrell noticed it on Beeston Common in 1900, four or five miles from the Bodham pine-woods. Mr. Bennett pointed out (*op. cit.* 393) that the plant had been known in Norfolk since 1885, and had been recorded from Holt in 1891. If *Goodyera* be not native in Norfolk (as to which see Mr. Marshall's note in *Journ. Bot.* 1903, 25), it evidently extends over a considerable tract of country. It may be pointed out that the name *Peramium*, adopted for the genus by Messrs. Groves in their edition of Babington's *Manual*, cannot stand. It was published (in *Trans. Hort. Soc.* i. 301) by Salisbury in 1812; he no doubt detected its distinctness from *Neottia* and *Satyrion*, and regarded *N. repens* as its type, but his name is accompanied by no diagnosis, and must be regarded as a *nomen nudum*, so far as the establishment of the genus is concerned. *Goodyera*, established by Brown in Aiton's *Hortus Kewensis* (ed. 2, v. 197, 1813), therefore stands as the generic name.—JAMES BRITTEN.

ALIEN PLANTS NEAR LONDON. — My friend Mr. F. Raine, of Hyères, and I have collected several interesting aliens this summer in the neighbourhood of Croydon, some of which are not to be found in Mr. Dunn's *Alien Flora of Britain*. Perhaps the most surprising was a plant of *Cirsium monspessulanum* All., which I have compared with Jacquin's type of *Carduus monspessulanus* in Herb. Brit. Mus., growing on a new but disused road between Thornton Heath and Norbury. This thistle grows in damp places in the South of France from the Alpes Maritimes to the Central Pyrenees, and on both sides of the Rhone as far north as Savoie, and in Spain, Italy, and Algeria. At a glance it differs from most thistles in its leaves, which are glabrous on both sides and not prickly, but merely edged with sharp spinous ciliæ. Growing near it on the waste land we observed *Senecio viscosus* (in large quantity), *S. sylvaticus*, *Anthemis tinctoria*, *Serratula tinctoria*, *Erigeron acre*, *E. canadense*, and *Alyssum incanum*. In a gravel pit nearer Croydon, and not far from flour-mills, we found, associated with *Erysimum orientale*, *Lepidium ruderale*, *Matricaria discoidea*, *Nasturtium palustre*, and *N. sylvestre*, a small quantity of a vetch which matches a single sheet in the British Museum Herbarium named *Vicia Boissieri* Heldr. & Sart., no. 749 bis, from Greece (Parnassus), which Halácsy (*Conspectus Floræ Græcæ*, vol. i.) considers a variety of *V. villosa* Roth. Believing, however, in opposition to certain continental botanists, that *V. villosa* and *V. varia* Host are quite distinct species, I would place both the Croydon and the Parnassus vetch as the

affinity of *varia* rather than *villosa*. Indeed, both plants bear a strong resemblance to a vetch from Bath (in Herb. Brit. Mus.) which Mr. Dunn collected and named *V. varia*, though he omits the species from his *Alien Flora*. Halácsy reduces *V. varia* Host to *V. dasycarpa* Ten., but as Host published his plant in 1827, two years before Tenore, the former should stand. In June, 1904, on waste ground near Kew Gardens Railway Station, I found a beautiful and large-flowered vetch, which is *V. pannonica* Crantz β *purpurascens* DC. It is identical with a specimen in Brit. Mus. gathered as a weed in Devon in 1866 by the late Mr. Archer Briggs, and with a Bucks specimen from Mr. Druce in 1903. Dunn does not give the variety of *pannonica* in his *Alien Flora*. Two years ago, near Walton-on-Thames, Major Wolley Dod and I came upon a mass of *V. villosa* Roth., finer than I have seen it even in the South of France, where many plants grow twice the size they do in England. *V. melanops* Sibth. & Smith = *V. tricolor* Seb. & Maur. is another vetch not recorded in the *Alien Flora*. There is a specimen of this beautiful plant in the Brit. Mus. Herb. from Portishead, Somerset, collected by Miss G. Lister. On Streatham Common is a bush of *Rubus laciniatus* Willd., the fruit of which species is selling at one shilling a pound in London this autumn, and in a field near by are plants of *Amaranthus retroflexus* L. I have specimens in my herbarium of *Rubus laciniatus* from a "field by St. Mary's Church, Peckham," collected in 1856 by Thos. Clark, jun. Mr. Moyle Rogers gives only one locality for it in his "Rubi of the Neighbourhood of London" (Journ. Bot. 1903, 87-97), but he remarks that he has not been in the habit of noting localities for this plant in England, which he finds as a rule in gardens or in waste places near them. — H. STUART THOMPSON.

NOTICES OF BOOKS.

George Bentham. By B. DAYDON JACKSON. "English Men of Science" Series. 8vo, cl. pp. viii, 292. Price 2s. 6d. net. Dent & Co.

It is not easy to understand on what principle Bentham is selected for an early volume of a series devoted to "English Men of Science." That he held a distinguished position among these, no one would dream of doubting; but it can hardly be maintained that his personality was such as to make a detailed account of his life interesting. The notice which Mr. Jackson contributed to this Journal on Bentham's death (Journ. Bot. 1884, 353) revealed him, indeed, as far more human than those who knew him during the the latter part of his life would have supposed; his intimate friend Sir Joseph Hooker bears testimony to his "amiable disposition and sterling qualities of head and heart," but even he adds that Bentham's "cold manner" and "constitutional reserve or rather shy-

ness, prevented many from appreciating his fine disposition and generous qualities."

The first hundred pages, which are largely drawn from Bentham's MS. autobiography, contain many references to botanists of the early part of the last century—Hooker, Brown, Wallich, Lambert, Lindley, Arnott, and others,—but abound in details which, it seems to me, can be of no possible interest to anyone. This feature becomes even more prominent when the autobiography ceases, but even then abounds in absurdly trivial details. Take the following account of the Benthams crossing to England in 1826:—

"On reaching Calais it was so rough that no packets dared venture out for two days, then turning fair, with smooth water, the boat might have started," but the Marchioness of Downshire had persuaded the captain to wait till the afternoon for her convenience; after all she did not go in that boat, which had to start without her; meanwhile the wind had risen, and a very slow and unpleasant passage was made. They posted from Dover, slept at Sittingbourne, reached London on 12th September, and the whole family dined at Jeremy Bentham's."

Surely this is as uninteresting as the details in one of Mr. Henry James's later novels! and Mr. Jackson's style is not that of Mr. Henry James. On the same page (p. 51) we have the following:—"George received a special invitation to dine with his uncle; after dinner he suggested that George should undertake to prepare his uncle's works for printing; he consented to give two evenings weekly to this object;" and again—"Bentham was entered at Lincoln's Inn on 21st October, to his uncle's disgust, as he was apt to inveigh against law, though bred a barrister, as entailing insincerity, and hinting that the relations between the two would be imperilled." Such sentences abound throughout the book, and, with the numerous misprints, especially in proper names, suggest that Mr. Jackson has written the book in a hurry and corrected the proofs under pressure.

From the time when, in 1818, at the suggestion of his mother (whom Asa Gray considered "a very good botanist") he began to dry plants, until his death in 1884, botany occupied an important place in Bentham's life, and indeed became his absorbing interest. Mr. Jackson's bibliography includes nearly two hundred items, beginning with the Catalogue of Pyrenees plants published at Paris in 1826, and including such works as the *Flora Australiensis*, *A Handbook to the British Flora* (which, from its own standpoint, was an admirable introduction to its subject), and (with Sir Joseph Hooker) the monumental *Genera Plantarum*. He was indeed an indefatigable worker; for nearly thirty years he was almost daily at the Kew Herbarium, arriving at ten and working without any interval for refreshment until four or five. He was warmly devoted to the interests of Kew; in 1854 he presented his herbarium, and on every occasion when such action seemed to him called for, set forward its claims, somewhat to the disparagement of the National Herbarium at the British Museum. That herbarium, indeed, he consulted as

little as possible; even when preparing his *Flora Australiensis*, his visits were mainly confined to an examination of the herbarium of Robert Brown, then stored at but not the property of the Museum; the plants of Banks and Solander were for the most part left unnoticed, nor did he, unless very exceptionally, consult the drawings by Sydney Parkinson taken during their voyage. His evidence before the Royal Commission in 1871 was strongly in favour of the transference of the National Herbarium to Kew. Mr. Jackson can hardly be blamed for avoiding any reference to this which might appear polemical, yet I think some account of Bentham's views on the subject would have been of greater interest than many of the details in which the book abounds; and caution seems carried beyond due limits when we are told (p. 226) that in 1873 "there was some brisk correspondence in *Nature* between Bentham, Sir R. Owen, and Mr. Carruthers," without any hint as to what it was about! That Bentham expected the union of the herbaria at Kew as a result of the Commission is evident from a remark in his presidential address to the Linnean Society in 1871; after a eulogistic reference to Kew, he says: "Of the valuable botanical materials accumulated in the British Museum during the last century, I say nothing now; for the natural history portion of that establishment is in a state of transition, and my own views as regards botany have been elsewhere expressed."

It was in 1874 that the crisis took place at the Linnean Society which resulted in Bentham's withdrawal from the presidency which he had held since 1861. Mr. Jackson says that "an adequate presentation of the case on each side cannot be here attempted," but it is a little unfortunate that he gives only a partial account of it. A very little tact on Bentham's part with regard to the trifling matter which led to such serious results would have prevented a scene which all regretted; but Bentham was naturally an autocrat, and his thirteen years' control of the Linnean Society had confirmed him in his autocracy. Those who wish to read a less one-sided account of the proceedings will find it in this Journal for 1874, pp. 63, 96.

However regrettable the means by which it was brought about, it may be said that Bentham's retirement was for the ultimate good of the Linnean Society. To say this is in no way to underestimate his services thereto. He devoted more time to it than has any President ever done, either before or since, undertaking the botanical portion of the Secretary's work—there was then only one Secretary, who was a zoologist; the Thursdays of the evening meeting were spent by him at the Society's rooms; the analysis of the publications received by the Society, published in the *Proceedings* from 1868 to 1874, was from his pen, and he compiled the index to Mitten's *South American Mosses* (published as vol. xii. of the Society's *Journal*) as well as the index to the twenty-five volumes of the *Transactions*. But the meetings held under his presidency were formal in the extreme. I remember the first which I attended in the old rooms at Burlington House in the latter part of 1869. The exhibitions and demonstrations which now form a

prominent—perhaps sometimes *too* prominent—a feature were practically non-existent; discussion of the papers was not encouraged, and after one or two leading men had been called upon and responded or declined to respond, the date of the next meeting was announced and the President left the chair. The conduct of the Society had, in short, fallen into a routine from which nothing but a change of president would have set it free.

Bentham had little patience with those whose work led them in directions with which he had no sympathy. Dr. Kuntze sums up in a characteristic sentence his position with regard to questions of nomenclature: "Surely Bentham was a genius of botanists, I admire him also, but he was a great sinner in nomenclature, who worked stupendously, but did not lose time in looking out for the rights of older authors and priority of their given names." (Revis. Gen. cxlviii.). That Bentham considered nomenclatorial investigations "loss of time" is evidenced by the letter—which seems scarcely courteous considering the position of its recipient—to Ferdinand von Mueller: "one of the last scientific letters written by him," says Mr. Jackson, "which so clearly states the writer's views on many points in botany at the close of his career." Bentham is writing of Mueller's *Census of Australian Plants* and severely criticizes that work, which, he says, "shows a great deal of laborious research into the dates of plant-names . . . but all that is not botany;" and he implores Mueller "to give up the vain endeavour to attach the initials 'F. v. M.' to as many specific names, good or bad, as possible." The plea of convenience, which for so long characterized the Kew nomenclature, found a strong supporter in Bentham; thus (Journ. Linn. Soc. xix. 19) he speaks of "names which have been so long and so universally adopted that they must be considered as having acquired a right of prescription to overrule the strict laws of priority;" and adds, "it would indeed be mere pedantry, highly inconvenient to botanists and so far detrimental to science," to restore such names.

His attitude towards those whose observations led them to the segregation of species was similarly unsympathetic. His work was mainly carried on in the herbarium, notwithstanding his daily proximity to the living plants in Kew Gardens, and the preparation of the *Genera Plantarum* and the necessity of correlating an enormous mass of material naturally led him to take large views of species. No one, I suppose, doubts that segregation has been carried to excess, especially in these later days—it can hardly be expected that the multitudinous published "species" of *Rubus* or *Hieracium* will ultimately retain that rank; but Bentham's *dictum* in his first presidential address to the Linnean Society—"Mr. Jacob Müller, who in a three days' excursion in the Vosges finds 31 new Brambles and devotes 40 pages of the *Bonplandia* to their description, and 225 pages of the *Pollichia* to 239 *Rubi* from a very limited region, may be said to have done little more than supply the world with so much waste paper."*—seems unnecessarily

* Proceedings of Linnean Society, 1860-61, lxxi.

harsh. Whatever may be said as to the excesses of the "splitters," their work has encouraged minute and careful observation, and in this respect may be regarded as an important factor in any ultimate judgement that may be arrived at as to the rank to be accorded to doubtful plants.

The last chapter of the book, which is devoted to a summary of Bentham's life and character, is in some respects the most interesting, and is very well done. Mr. Jackson knew Bentham as intimately as any one not immediately connected with him was likely to know him, and his summary, though brief, is graphic and well informed—the following description of Bentham's personal appearance aptly recalls the man:—"In early and middle life he was nearly six feet, tall and erect, though in late years a stoop caused much of his height to be lost. His hair was originally black and abundant, with a curious white lock at the side of his head; in late life his hair was still fairly abundant, but silvered with age, though more scanty on the top of the head. His sight was strong, and he wore spectacles all his life after boyhood; he would push these up on his forehead when examining a plant with the naked eye, and that done, a movement of the brow would settle the spectacles once more in place. His eyes were dark and piercing, his features strongly marked and almost hawklike." The somewhat feeble frontispiece, from the portrait by Lowes Dickinson (painted in 1870) at the Linnean Society, is, I think, less characteristic than the photograph which accompanied Mr. Jackson's notice in this Journal for 1884.

As a record of strenuous and long-continued work on the part of one who might have devoted himself to a life of leisure and pleasure, the biography is of value; Mr. Jackson has done his work conscientiously and thoroughly, even to the preparation of an unnecessarily detailed index, and it is not his fault that his subject was not more interesting.

JAMES BRITTEN.

TWO TEXT-BOOKS.

A Text-book of Botany for Secondary Schools. By JOHN M. COULTER, A.M., Ph.D., Head of Department of Botany, University of Chicago. 8vo, pp. vii, 365, tt. 320. London: Appleton. 1906. Price 5s. net.

The Study of Plant Life for Young People. By M. C. STOPES, D.Sc., Ph.D. 8vo, pp. xii, 202, tt. 154. London: Moring. 1906. Price 1s. 6d. net.

PROF. COULTER'S text-book recalls in its wealth of illustrations and the general excellence of its production the previously published manuals by the same author, of which it is the natural outcome, namely, *Plant Studies*, *Plant Relations*, and *Plant Structures*. The *Text-book of Botany* represents the result of co-operation between the author and the teachers who have been using the *Plant Studies* for the last five years; an attempt has been made to adapt the book as nearly as possible to the expressed needs of those for whose use

it is intended. The frequently adopted division of the subject-matter into morphology, physiology, and special morphology or classification, is not followed here. The arrangement is from the general and easily observed to the more special. The first five chapters are a description of the general structure, functions, and relationships of the obvious plant organs—leaves, stems, and roots, with an account of seed-germination. The subjects are copiously illustrated; some excellent photographic reproductions of leaf-arrangement call for special mention. The following thirteen chapters, occupying nearly two-thirds of the whole, give an outline representation of the great plant-groups, illustrated by brief descriptions of typical members. Though necessarily brief, the descriptive matter, helped by the numerous figures, forms a useful general account of the morphology and relationships of the great groups and their important subdivisions. Under Angiosperms are chapters on "Flowers and Insects" and "Seed-dispersal." Two short chapters deal with plant-breeding and forestry, and the four last are devoted to plant-associations, and consist largely of full-page plates illustrating types of vegetation. The book is an attractive introduction to the study of botany.

In her *Plant Life for Young People* Miss Stopes has succeeded in presenting in simple language the important facts in the life and growth of plants. Special emphasis is laid on the fact that the plant is alive, and the first part of the book is occupied with a series of suggestions for simple observations and experiments which go to prove that plants live, breathe, feed, and grow, and, on the whole, show the same signs of life as do animals. In the second part the parts of a plant's body and their uses are discussed, while part 3, "Specialization in Plants," describes the adaptation of the parts and of the plant as a whole, for various purposes, such as the climbing, parasitic, or insectivorous habits. Part 4, "The Five great Classes of Plants," gives a short account of the external features characteristic of the great plant-groups; and part 5, "Plants in their Homes," forms an excellent introduction to the study of plant-associations. The text is well illustrated by a few good plates and a number of smaller text-figures, which, if somewhat crude, have the claim of originality, and the book is very cheap.

A. B. R.

BOOK-NOTES, NEWS, &c.

THE CHAREÆ OF NORTH AMERICA, by Charles Rudd Robinson (Bull. New York Botanic Garden, vol. iv. pp. 244-308; issued June 25th, 1906), is a careful and painstaking account of the representatives of the *Chareæ* division of the *Characeæ* which have been found in North America. The introduction contains a good account of the structure and development of the *Characeæ* generally, followed by a sketch of the literature of the subject. The author has departed from Braun's generally accepted grouping of the species of

Chara under the sections *Haplostephanae* and *Diplostephanae*, subordinating the stipulode character to that of the cortication, with the result that *C. gymnopitys*, *hydropitys*, and *Hornemannii* are separated from the closely-allied *C. Braunii*, and placed between *C. vulgaris* and *C. fragilis*. The key to the species is in some parts not altogether satisfactory, as, for instance, when the presence or absence of calcareous incrustation is used as a character. The descriptions of the species are full and carefully drawn up, and measurements of the various parts are given. The paragraphs dealing with the geographical distribution might, we think, with advantage have been amplified by the enumeration of the localities in the case of the rarer species, instead of merely indicating the limits of their distribution. A fuller reference to published specimens would also have been desirable. Of the fifty species, twelve are described as entirely new, while fourteen are recognized varieties or forms elevated to specific rank. Alexander Braun, in his later works, reduced a number of his former species to subspecies and varieties, and from Mr. Robinson's statement it appears that Dr. Allen's final views tended in this direction. Mr. Robinson takes the opposite course. For instance, fifteen of his species would be included in Braun's aggregate *C. gymnopus* (= *C. zeylanica* Willd.). Though we may not agree with this view of species, we cannot but recognize that such careful and complete descriptions of the segregates must have a certain value. The work contains a large amount of information, and is altogether a valuable contribution to the literature of the group.—H. & J. G.

DR. THEODORE COOKE'S *Flora of the Presidency of Bombay* continues to make satisfactory progress. The most recent instalment (vol. ii. part 3) carries on the enumeration from *Verbenaceæ* to *Euphorbiaceæ*. At the end of the principal genera are short descriptions of the non-indigenous species which are frequent in gardens throughout the Presidency—a feature which adds to the practical utility of the work. Dr. Cooke rightly points out that the correct spelling of the genus often written *Petræa*—*e. g.* by Engler & Prantl and Bentham & Hooker—is, both on etymological and historical grounds, *Petrea*.

MR. RIDLEY publishes in the Journal of the Straits Branch of the Royal Asiatic Society the results of an expedition to Christmas Island undertaken by him in 1904. He made a complete collection of the flora of the island, to which his list records many additions and a certain number of new species—*Limacia nativitatis*, *Grewia osmoxylon*, *G. insularis*, *Eugenia gigantea*, *Zehneria alba*, *Heptapleurum natale*, *Ardisia pulchra*, *Asystasia alba*, *Boerhaavia cæspitosa*, *Balanophora insularis*, *Claoxylon cærulescens*, *Dendrobium pectinatum* (*D. Macraei* Rendle), *Corymbis angusta*, *Zeuxine exilis*, *Pandanus nativitatis* (which should be compared with *P. christmatensis* Martelli in *Webbia*, p. 362), *P. elatus*, *Panicum ciivale* and *Selaginella rupicola*. A list of the plants probably introduced to the island by sea-currents is added.

THE Institute of Commercial Research in the Tropics in connection with the Liverpool University is issuing a Quarterly

Journal dealing with matters relating to economic botany from a laboratory as well as a practical standpoint. In No. 3, for September, are notes on the agricultural products of the Ivory and Gold Coasts, and an interesting account of the tribal constitution of a district of the latter region.

THE new Director of Kew is to be congratulated on the steady issue of the *Bulletin of Miscellaneous Information*, which this time looks as if it had come to stay. We note with special satisfaction the publication of the additions made to the Herbarium during recent years. It is an important and indeed essential adjunct to the usefulness of any institution that folk should be able to know what they are likely to find there and how its contents are increased, and this, during the late directorate, has been impossible so far as Kew has been concerned. Nos. 6 and 7—we are glad to notice that the almost always misleading date no longer appears on the wrapper—contain descriptions of novelties from Africa and from various localities from specimens in the Kew Herbarium, and (in No. 6) a reprint of Mr. J. H. Maiden's history of the Sydney Botanic Gardens up to 1848, wisely placed here as a more permanent record than the newspaper in which they were published could afford. In No. 7 is a list of the *Mesembryanthemums* cultivated at Kew, with reference to the position held in horticulture by the genus in former times when it was in greater favour than it is at present. Workers at this difficult genus must not overlook the volume of drawings by Ann Lee in 1777-8, preserved in the library attached to the National Herbarium, or the drawings in Masson's collection in the same institution. We note that in the list in the *Bulletin* the name "*M. digitiforme* Haw."; if by this *M. digitiforme* Thunb. is intended, that name is antedated by *M. digitatum* Ait. (see Journ. Bot. 1884, 146).

WE received from Prof. Oliver for publication some comments on the article on "Botany in England" published in this Journal for September (pp. 310-314). We suggested the omission of certain personalities in no way affecting the argument, but Prof. Oliver, having recast his paper, now proposes to publish it in the *New Phytologist*.

WE issue as a supplement to this number the greater part of the International Rules for Botanical Nomenclature adopted at the International Botanical Congress held in Vienna in 1905; the concluding portion will include a list of the genera represented in British books for which the Conference decided, for reasons which may or may not appear convincing, to set aside the earliest name. We shall probably have something to say on this and possibly on other points raised by the Rules, but in the interests of uniformity and convenience it seems desirable that they should be implicitly followed. The scientific results of the Congress have been published in a handsome quarto volume, including papers by M. Briquet, Prof. Engler, Dr. Lopriore, Dr. Lotsy, Beck v. Mannagetta, and other botanists. The only contribution in English is that by Dr. D. H. Scott, on "The Fern-like Seed-plants of the Carboniferous Flora."

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EDITED BY

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Without professing to occupy the vast field of general Botany, the Journal has from its inception filled a position which, even now, is covered by no other periodical. It affords a ready and prompt medium for the publication of new discoveries, and appears regularly and punctually on the 1st of each month. While more especially concerned with systematic botany, observations of every kind are welcomed. Especial prominence has from the first been given to British botany, and it may safely be said that nothing of primary importance bearing upon this subject has remained unnoticed.

Bibliographical matters have also received and continue to receive considerable attention, and the history of many obscure publications has been elucidated. Every number contains reviews of new and important books written by competent critics: in this as in every other respect a strictly independent attitude has been maintained. While in no way officially connected with the Department of Botany of the British Museum, the Journal has from the first been controlled by those whose acquaintance with the National Herbarium has enabled them to utilize its pages for recording facts of interest and importance regarding the priceless botanical collections which the Museum contains. In 1896 it became necessary to increase the size of the Journal, owing to the number of papers sent for publication: the number of plates was at the same time augmented.

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Salvia Marquandii Druce

SALVIA MARQUANDII, SP. N.

BY G. CLARIDGE DRUCE, M.A., F.L.S.

(PLATE 483.)

IN June and July last I visited the Channel Isles, one of my chief objects being to clear up the mystery connected with *Salvia clandestina*. I made a careful search in Jersey, but saw there only *S. Verbenaca*, which showed no definite variation except that caused by difference of soil and exposure. But in July, whilst in the company of Mr. E. D. Marquand, the well-known naturalist and author of the excellent *Flora of Guernsey*, I noticed growing in grass on light sandy soil at Vazon Bay, in Guernsey, a *Salvia*, which I at once saw was new to me and obviously distinct from *S. Verbenaca* or the true *clandestina*, which I have seen in its classic locality. It appeared to be limited to a small area, although we searched somewhat diligently along the north coast; nor could I see it in Alderney, where *S. Verbenaca* is such a conspicuous feature.

The history of the plant which has been called *S. clandestina* in Britain dates from the publication of Babington's *Primitiæ Floræ Sarnicæ* in 1839, where the author records it from near Pontac and St. Clements in Jersey, and also from Guernsey. It may be well at once to say that, in my opinion, no specimens of true *clandestina* from Britain are contained in the Babington Herbarium at Cambridge, all being forms of *Verbenaca* only; I believe Mr. Pugsley has come to the same conclusion, and this, too, was Syme's view. At the date mentioned Babington had only recently begun his work on the British Flora, and did not seem to be aware what was the true *clandestina* of Linnæus; he refers his Channel Islands plant doubtfully to that species, but quotes Bentham, who had materially widened the definition of that plant from that covered by the description in the *Species Plantarum*. Babington does not seem to have been aware that Smith's *clandestina* was still a different species, while he tried to obtain specific distinction from the leaf-characters, which I think, notwithstanding M. Briquet's monumental work on the *Labiata*, where weight is attached to this character in differentiating the *Salvias* of this section, can scarcely be so valuable as those drawn from the shape and colour of the flower; at any rate, the latter characters should not be ignored.

Modifications in the description of *S. clandestina* are made in the later editions of Babington's *Manual*, but they do not fit the restricted plant, and it is difficult to believe he had the true species before him, nor do they agree with the Guernsey plant.

In the third edition of *English Botany*, Syme, with a query, identifies a plant (which is preserved at Kew) which he has seen in the Borrer Herbarium, gathered in Guernsey, as *S. clandestina*, and this is, I think, identical with the plant which I am about to describe. The figure, t. 1057, is rather poor, and the colouring bad, as our plant has clear blue (*beau bleu*), not purplish flowers.

Syme gives several synonyms, some of which belong to the true *clandestina*, but none, I think, to my plant.

It may be well to state what I consider to be the true *S. clandestina* L. Fortunately there is not great difficulty in this case in arriving at a conclusion. Linnæus diagnosed it (*Sp. Pl.* ed. 2, p. 86) as "*S. foliis serratis pinnatifidis rugosissimis, spica obtusa, corollis calyce angustioribus*"; he cites as a synonym "*Horminum sylvestre, inciso folio, cæsius flore, italicum*. Barr. rar. 24, t. 220," and gives a detailed description. A reference to Barrelier's work (*Pl. per Galliam, Hispaniam et Italiam observatæ*, 1714) shows that the plant there described and figured differs essentially from the Guernsey plant; it is *S. clandestina* L., common in many parts of Spain, France, and Italy, which Barrelier saw on the Roman Campagna.

The identity of the true *clandestina* was somewhat obscured by its being represented in the Linnean Herbarium by the eastern *S. controversa*; hence Smith, who then had the Linnean Herbarium in his possession, when he prepared Sibthorp's *Flora Græca* and wrote the *Prodromus*, described and figured *S. controversa* as *S. clandestina* L.

It would seem probable that the excellent plates in Jordan and Fourreau's *Icones ad Floram Europæ* (where several *Salvias*, under the generic name of *Gallitrichum*, are figured) might have included one representing our plant, but I am unable to match it: those having a concolorous corolla have a very differently-shaped flower, so that only in an extremely aggregate sense could they be considered to belong to the same species.

Under *S. pratensis*, in Corbière's *Nouvelle Flore de Normandie*, p. 453, there is described var. *parriflora* Lec. & Lam., the *S. dumentorum* Bor. and (?) of Andrzejowski, but if this is the same plant as that of Andrzejowski it is quite different from our plant.

I have searched through the Herbaria of the British Museum and Kew, but can find no named plant that agrees with the Vazon *Salvia*, which I therefore venture to distinguish by the name of a botanist who has done such excellent work in the island where it grows.

Salvia Marquandii, sp. n. Herbaceous. Rootstock woody, thick and large. Height of thirty specimens 30–45 cm., simple or with 2–5 branches. Radical leaves rather long, stalked, the average length of stalk of lower leaves 25–30 mm., of the leaf-blade 50 mm., breadth 25 mm., oval-oblong, subobtuse, more or less deeply crenately lobed, the lobes crenate or crenate-dentate. The upper leaves sessile, more acute, and sometimes more sharply and more deeply cut, narrow-oblong, or slightly triangular-ovate, all subglabrous, slightly hairy on angles of petiole, yellowish green, and somewhat rugose. Bracts semicircular-ovate, cuspidate, cordate, at length reflexed, and falling as the seeds ripen. Verticillasters subspicate, the lower whorls rather distant, 4–5-flowered. Calyx campanulate, 5–6 mm., upper lip broad, flattish recurved, concave towards the apex, and abruptly narrowed into three minute teeth; the divisions of the lower lip lanceolate and gradually narrowing

into two longer teeth. Corolla slightly more than twice the length of the calyx (12–14 mm.); tube naked, 8–9 mm., the exposed portion of the tube 3 mm. The upper lip longer than the tube (5·5–7·5),* nearly semicircular in outline (galeate, not falcate), glabrous except for a few hairs on the vein of the exterior upper part of the upper lip. Style ultimately exerted beyond the upper lip. Corolla of a pale clear blue. The whole plant smells rather of calamint, quite different from the heavy odour of *S. Verbenaca*.

Syn. *Salvia clandestina* Syme in E. B. ed. 3, vii. p. 434, t. 1057, not of Linn.

From *S. Verbenaca* this may be distinguished at a glance by the much more prominent and differently-shaped lighter blue flowers, its paler foliage, the more oblong, narrower and less acute leaves; by the less spiny teeth to the calyx, the absence of viscosity, due to the scarcity of glandular hairs, in the upper flower-whorls; and by its different odour. From *S. pratensis* it may be known by the flowers being not above half the size, although in shape approaching to them rather than *S. Verbenaca*, but less sickle-shaped, and in being quite eglandular. From the true *S. clandestina* L. it is clearly separated by the concolorous wholly blue flower, whereas *clandestina* has the lower lip white or very pale; by the more gracefully-shaped and more prominent corolla; and by the less rugose and often less divided leaves.

EXPLANATION OF PLATE 483.—1, *Salvia Marquandii*, natural size. 2, bract. 3, 4, calyx. 5, flower: this is not well represented in the figure; the upper lip is not sufficiently curved, and the swelling in the lower part of the throat represented as too prominent. The drawing of the upper flower on the right-hand side of the flowering branch more nearly represents the normal flower. All twice natural size.

NOTES ON THE FLORA OF PORQUEROLLES.

By H. STUART THOMPSON, F.L.S.

THE flora of the small island of Porquerolles, five miles long by about one and a quarter mile broad, is so rich that it may be of interest to mention a few of the rarest plants I gathered there on June 9th of this year in the company of Mr. F. Raine, of Hyères, and the Rev. E. Ellman.

The island is now very accessible from the mainland, for a Land Development Company which is exploiting the place conveys one by motor car from Hyères to the coast, and thence across to Porquerolles by steamer and back for the small sum of three francs. Botanists visiting the Riviera will be rewarded by a day on the island, for—in addition to seeing many of the plants of the mainland and some, e. g., *Matthiola tricuspidata*, *M. sinuata*, and *Pan-cratiū maritimum*, which grow on the extremely interesting sandy isthmus known as La Plage de Giens, connecting the mainland

* I am indebted to Mr. H. Baker for these measurements from my series of specimens.

with the beautiful Presqu'île (where there is a good inn)—at Porquerolles may be seen such rarities as *Genista linifolia* L., several bushes of which also grow on a hill near Hyères,* and *Lathyrus tingitanus* L., whose striking crimson flowers are almost as large as those of a sweet pea. It has also been recorded from Gibraltar, Malaga, Madeira, the Canary Isles, Morocco, and the Nilgiri Hills.

In sandy ground under the pines we found the blue *Lupinus hirsutus*, *Asterolinum stellatum*, and the equally slender *Galium divaricatum*, *Helianthemum tuberaria* Mill. (so distinct from all others of its race), *Ornithopus compressus* and *O. ebracteatus*, *Lotus angustissimus*, *Vicia atropurpurea* (in addition to the two very rare species mentioned later), *Passerina hirsuta*, *Pulicaria odora*, a variety of *Polycarpon tetraphyllum*, *Herniaria cinerea*, *Bartsia Trixago* (whose beautiful white flowers so love the sea), *Euphorbia Pithyusa*, *Allium acutiflorum* Lois., in very small quantity, and *Carex gynobasis* Vill.

On the rockier ground grew *Plantago subulata* L., *Bonjeania hirsuta* Reich. var. *incana* Koch (a very distinct and unusual variety with thick silky leaves of a silvery colour), *Lotus Allioni* Desv., *Dorycnium suffruticosum*, *Anthyllis Barba-Jovis*, *Vincetoxicum nigrum* Moench, *Senecio crassifolius*, and *Dactylis hispanica*.

An *Orobanche* on a Composite, with broad lower lip remarkably cut and jagged, pale yellow stigma, flesh-coloured petals lined with pale red, and glandular sepals with two setaceous teeth, one three times the length of the other, has not yet been named.

The handsome *Delphinium Requienii* DC., peculiar to Corsica, Sardinia, the Balearic Isles, and the Isles of Hyères, we could not find; but as it used to grow in a part of Porquerolles remote from the portion which is being turned into a huge building estate, we may hope that it still lingers there. Among the slatey rocks called Les Mèdes, at the top of the island, some 500 or 600 ft. above the blue sea, are large patches of *Statice minuta* L., forming tufts 6-10 in. across, *Bonjeania hirsuta*, &c. At this spot was one tiny burnt-up plant of *Vaillantia muralis*—which in this state reminds one more of *Rumex bucephalophorus* than of a Rubiaceous plant—and a little *Asplenium lanceolatum*. The *Vaillantia* we afterwards saw more of on a sea-wall near the pier, together with *Sedum rubens* L.

The only kind of gorse we noticed anywhere on the Mediterranean or in the Alpes-Maritimes was a bush of *Ulex parviflorus* in a thicket close to the harbour of Porquerolles; and we believe no other species of *Ulex* is found on the Mediterranean. Near this bush of gorse was a bramble, which Mr. Moyle Rogers has named

* Mr E. G. Baker has since drawn my attention to a sheet of *Genista linifolia* var. *leucocarpa* Rodriguez, from Minorca, in Herb. Brit. Mus., with which my specimens both from Porquerolles and the mainland seem to agree, although there seems to be little in the variety besides the colour of the pod, which is distinctly white. Rodriguez speaks of "gousse lanugineuse à tomentum blanc" in his description of the variety in *Bull. Soc. Bot. de France*, xxv. 238; whereas Grenier & Godron in 1848 described the pod of *G. linifolia* "coverte d'un tomentum brun," and they gave Isles d'Hyères as the habitat. We know of no other locality for the variety *leucocarpa* except Canum in Minorca, where it is rare.

Rubus rusticanus Merc. *Rubus tomentosus*, the characteristic bramble of the Riviera and the Pyrénées-Orientales, which extends through Central and Southern Europe as far as Persia, I do not remember noticing on Porquerolles.

The curious seaweed *Posidonia oceanica* is seen washed up on the coast, but happily not in such abundance as on the Plage de Giens, where the masses of long dead leaves were several feet deep, and so dense on June 7th that I had to walk a good mile before I found a place where I dared take a plunge.

The pines on Porquerolles are mostly *P. Pinea* and *P. Pinaster*, but we also observed a few umbrella pines. The shrubs and larger plants are very similar to those frequently seen on the French Riviera, and include, in addition to those already mentioned, *Daphne Cneorum*, *Arbutus Unedo*, *Erica Scoparia*, *Phillyrea angustifolia*, the sweet-scented *Cistus monspeliensis* and *C. salviæfolius*, *Pistacia Lentiscus* and *P. Terebinthus*, myrtle (*M. communis*), *Ruscus aculeatus*, and *Juniperus phœnicea*. Climbing plants were represented by *Rubia peregrina*, *Tamus communis*, and the inevitable *Smilax aspera*.

The only orchid we noticed on the island was *Limodorum*, but of course we were late for orchids. The most luxuriant grass after *Arundo Donax* was *Piptatherum multiflorum*, with many of its barren branches simulating those of a small bamboo. *Cynodon Dactylon* was in full blossom here on June 9th, though I did not observe it in flower elsewhere during the next three weeks.

Our most interesting find was a new vetch, of which a description follows.

***Vicia monosperma*, sp. nov.** Annual, 50–60 cm., pubescent, erect. Leaves with four (rarely five) pairs of leaflets, each leaf having a simple or branched tendril; lower leaflets opposite, oval or obcordate, mucronate, upper leaflets narrowly linear lanceolate, 10–14 mm. long, obtuse, with a mucro, glabrescent above, with spreading hairs beneath. Lower stipules toothed sagittate, upper stipules entire, lanceolate with a purple blotch. Calyx when in flower slightly hairy, with equal teeth two-thirds the length of the tube, which is 5 mm. long, calyx markedly veined, the five chief veins extending into long needle-like teeth. Flowers very small, scarcely exceeding the calyx, pale violet, upper part of standard yellowish in dried specimens, solitary or rarely in pairs, subsessile. Pod, 15–20 mm. long by 4 mm. broad, black when mature, puberulent, solitary, somewhat sickle-shaped and gradually tapering into a long upcurved point. Seeds ovate, 3 mm. long, fawn-colour, blotched with dark brown, not tubercular, and only one in each pod (except in the case of one pod which has two seeds). My friend Mr. C. E. Salmon suggests that the tapering at the end of the pod is due to one or more seeds having become abortive.

A slender plant with the habit of *V. angustifolia*, with sometimes from 8–11 solitary flowers in the axils of the leaves throughout the whole length of the stem. It grows in the clearing of pine-woods in the Island of Porquerolles, off Hyères, Var, France, flowering at the end of May and beginning of June.

It differs from *V. lathyroides* forma *olbiensis* Reut. & Shuttleworth, in Herb. Rouy, which has also been found, among other places, in the Isles of Hyères—in the number of its pairs of leaflets, and in the shape and size of the pod, containing one seed, which is not tubercular as in *V. lathyroides* and the form *olbiensis*. But in *habit* it would apparently approach near to *V. olbiensis*, as far as one can tell from M. Rouy's description alone, for I know of no specimen in this country. My plant differs from *V. torulosa* Jord., whose seeds are similar, but which has from 8–16 pairs of leaflets. From *V. cuneata* Guss., which Grenier and Godron place between *V. angustifolia* and *V. lathyroides*, which bears yellow-green ripe pods with black seeds. *Vicia angustifolia* and all its varieties and forms (including *V. Bobartii* Forster), have much larger flowers and much longer and straighter pods, often 30–40 mm. long, with numerous seeds; the leaflets of *angustifolia* are also more numerous.

I have a typical specimen of *V. angustifolia* from the same portion of the island; also the nearly endemic species *V. elegantissima* Shuttleworth, which is quite distinct, and which we found in the bushier parts of the pine-woods. It also grows in one province of Spain.

The natural position for *Vicia monosperma* seems to be between *V. angustifolia* and *V. lathyroides*.

NUMERICAL REPRESENTATION OF PLANT DISTRIBUTION.*

I do not think Mr. Watson's latest view on this subject has been published. He sent me a sheet of his proposed plan, asking if I thought it would aid to see quickly the distribution of any British plant, and as this may be of interest, it is here reproduced:—

1395 SCIRPUS PARVULUS R. & S.

1 Peninsula.	1	2	<u>3</u>	4	5	6					
2 Channel.	7	8	<u>9</u>	10	<u>11</u>	12	13	14			
3 Thames.	15	16	17	18	19	20	21	22	23	24	
4 Ouse.	25	26	27	28	29	30	31	32			
5 Severn.	33	34	35	36	37	38	39	40			
6 South Wales.	41	42	43	44	45	46					
7 North Wales.	47	48	49	50	51	52					
8 Trent.	53	54	55	56	57						
9 Mersey.	58	59	60					Ribble.	Lune.		
10 Humber.	61	62	63	64	65						

* See *Journ. Bot.* 1906, 128.

11 Tyne.	66	67	68				
12 Lakes, Man.	69	70	71		Lake Lanc.	Westmd.	
13 West Lowlds.	72	73	74	75	76	77	
14 East Lowlds.	78	79	80	81	82	83	84
15 East Highlds.	85	86	87	88	89	90	91
Ditto.	92	93	94	95	96	Nairn.	Inv.
16 West Highlds.	97	98	99	100	101	102	103 104
17 North Highlds.	105	106	107	108	109		
18 North Isles.	110	111	112				

In America many forms of symbols have been adopted to show aquatic distribution in lakes, &c., but I am not aware that figures have.

In Holland the distribution of their Carices was shown on little maps, many on a page.

For the twenty-nine botanical divisions of Finland,* the distribution of the species has been shown by irregular squares, the first two letters of each division indicating where the plant occurred, and dots where it was absent:—

			Li.	.	.	.			
			.	.	.	.	.	.	
			Ob.	.	.	.	.	.	
			Om.	.	.	Kp.	.	.	
		.	.	.	.	.	.	.	
	.	.	.	.	.	.	.	.	
Al.	Ab.	N.	.	.	Ik.	.	.	.	

I do not see that much is gained by putting the figures in the form of the country, as Mr. Praeger suggests. It seems to me that Mr. Watson's plan is simpler, and can be added to as desired; but I would suggest that the figures be underlined in red ink, as bringing more clearly to the eye the object sought.

The Finland enumeration is accompanied by two capital maps, one a key to the other; on opening these and turning to the tabular representations, the distribution can be grasped at once. Of course, all these methods are simply introductions to the far wider question of mapping from the ecological standpoint. The maps of parts of Scotland by the late Robert Smith, and later ones of Yorkshire by his brother, contain a vast amount of work and information. As long ago as 1891 Mr. E. A. Wainio published

* *Herb. Mus. Fennici Pl. Vascul.* (1889).

"Notes sur la Flore de la Laponie Finlandaise,"* in which he discusses many points lately brought forward; *i. e.*, dominant species, relation of the species one to another (using ten forms of denomination), the highest latitude attained by the species whether in the Salix region or others, relations to rock systems, and many other most interesting reflections.

Then there is the chemical point of view with regard to peat-water (as in the difference shown by Mr. West in many Scottish lakes), the amount of calcium carbonate held in suspension,† &c.; in fact, the phases of botany are so various that other sciences must be brought in as an aid.

ARTHUR BENNETT.

THREE communications have appeared in this Journal (1896, 57; 1905, 344; 1906, 128) in favour of substituting numbers for the names of the counties of Ireland in recording the localities of plants, but none of them explained what advantage was to be gained by the change. I would like to express my views on the other side, and on the whole question of what is the benefit of so numbering the counties of the British Islands in compiling a topographical botany. I have yet to learn what is the use of the double designation of the locality by a number followed by a county name. This double-recording of the localities was, I believe, first brought into use by Mr. H. C. Watson in 1843, in what he called the third edition of his *Geography of British Plants*, of which only part i., down to *Papaveraceæ*, was issued. In it he divided Great Britain into eighteen districts, and each plant is accompanied by a map and an enumeration in the double form, thus: Peninsula, 1; Channel, 2; Thames, 3; &c. He elaborated this plan, omitting the maps, in his *Cybele Britannica*, published in 1847-1852; and subsequently he developed it into the form in which it now stands for 112 "vice-counties" in his *Topographical Botany*, first issued for private distribution in 1873-74, and published in a second edition in 1883.

When I turn over the 584 pages of this last work, I am fairly astounded at the waste of printing on every page; we have column after column of the numbers the author assigned to the counties, and alongside each number the full name of the county as an explanation of what the figures are meant to point out. In Mr. R. Ll. Praeger's *Irish Topographical Botany*, published by the Royal Irish Academy in 1901, there are 400 pages printed in the same method. Each plant has its column of the names of the counties in which it has been found, and to the county names are prefixed the figures by which Mr. Praeger would have botanists designate the counties of Ireland. Surely the county names of themselves at once designate, as one reads them up or down, the precise district of Great Britain or Ireland that the respective plant inhabited, and the numbers are unnecessary. We learned the

* *Act. Soc. Fauna et Fl. Fennica*, viii. n. 4.

† See Nicholson in *Trans. Norf. & Norw. Nat. Soc.* viii. 266, 268 (1905-6).

position of the counties of the whole United Kingdom when we were children, and now intuitively the name instantly recalls its position on the maps, an end that I cannot see is at all assisted by the numbers. In the instance, say, of *Primula elatior*, the numbers "19, 26, 29, 30" convey no idea of locality to my mind, while I can grasp at once the meaning of "Essex N., Suffolk W., Cambridge, Bedford," which are the localities for this plant.

In Watson's *Topographical Botany* there are 1428 of these columns of explanation, shorter or longer according to the extent of the distribution of each plant; in Mr. Praeger's *Irish Topographical Botany* there are 400 pages of similar columns. Every time I open Watson I am more and more impressed with the difficulty his numbers create; nor shall I ever forget my bewilderment on the first occasion of opening his work, and being introduced to what he calls his "provinces," "subprovinces," and "vice-counties." I asked myself "Are there no counties?" The county name without the prefixed number answers every purpose that a botanist can require, but Watson was not content with revolutionizing the appellations by which the counties are known; he abolished the use of the word "county" for which he substituted "vice-county," having much the same meaning as the older word "viscounty," and Mr. Praeger in his work abolishes "county" for the slightly larger word "division." And all the while in both books the county boundaries as the public knows them are strictly adhered to.

In the communications on the Irish portion of this subject that have appeared in this Journal and in the *Irish Naturalist*, the only reason given for the use of the numbers resolves itself into this, "H. C. Watson did it for Great Britain, and it is done for Ireland." This reasoning is like many another experiment that has been tried on Ireland. If somebody had the courage to put his pen through every one of those iterated columns of numbers in Watson and Praeger, he would be a benefactor to every student who is interested in the botany of these islands.

I do not enter a plea for the retention of the county names without having had a practical trial of Watson's numbers. In a little handbook of the British Hepatics that I printed a few years ago, I took the distribution of the Hepatics in Great Britain from Mr. W. H. Pearson's magnificent work, and inserted the numbers without the county names, as he had done; and I regret having done so. I constantly use my own book, and I have always to turn up the explanation of the numbers when I want to see in what county a certain plant has been found.

The samples of beautiful and ingenious maps recently presented to the public by Mr. Praeger, which recall the maps in Watson's *Geography of British Plants*, convince me that it is too late to map out the British Islands into rectangles, each designated by a number.

No reason has been brought forward against the use of the existing county names. One writer did allude to the contractions of the names of the Irish counties that have been already used by

the Rev. W. Moyle Rogers in his handbook of *British Rubi* and in my *Hepatics*, as if we had invented it. But there was nothing more new or original in those contractions, than in the use of "Jan., Feb., Mar.," &c., and "Mon., Tues., Wed.," &c.

H. W. LETT.

THE DISAPPEARANCE OF BRITISH PLANTS.

By G. S. BOULGER, F.L.S.

[THE following is a portion of a very interesting paper on "The Preservation of our Wild Plants," published in *The Journal of the Royal Horticultural Society*, vol. xxix. part 4 (December, 1905).]

There are undoubtedly many purely natural agencies by which the character of the vegetation of any country is constantly undergoing a gradual change, some species being lost and others added to its flora. Elevation of the land with reference to the sea may not only bring about land connections, and so facilitate the migration of species, but by producing desiccation, as has apparently happened in Biluchistan, may largely alter and impoverish the flora. The recent researches of Mr. Clement Reid as to the seeds found fossil in deposits geologically recent indicate the former presence in England of *Trapa*, the water-chestnut, and, among others, of species of *Naias* not now known here. It is noteworthy that these are aquatic forms. Who shall say whether their disappearance is due solely to such a natural cause as elevation of the land, or to some human interference such as the indirect drainage of the country dating from Roman clearing of our forests, or the deliberate drainage of later times? On the other hand, either with or without a depression of the land-level, we have had, and still have, local encroachments of the sea, which may cause the partial or complete loss of species. In a startling paper on "The Diminution and Disappearance of the South-Eastern Fauna and Flora within the Memory of Present Observers," communicated to the South-Eastern Union of Scientific Societies [in 1903], Messrs. Webb, McDakin, and Gray speak of the decadence in East Kent of no less than 500 species of plants, and not a few of these—such as *Statice*, *Salsola*, *Silene maritima*, *Hippophaë*, *Glaucium*, *Cochlearia*, *Euphorbia Paralias*, and *Lactuca virosa*—are attributed to encroachment by the sea.* Such causes of loss as these we may dismiss as being practically beyond our control. We do not urge the construction of breakwaters to preserve a few beautiful or interesting flowers. Equally inevitable, no doubt, are some of the losses attributable to the increasing density of population and its concomitants, clearing, draining, and building.

Though many species of flowering plants in the British Isles have undoubtedly been much reduced in numbers, and some are

* *South-Eastern Naturalist*, vol. viii. pp. 48-60.

now apparently on the verge of extinction, it is somewhat strange that I am not prepared to mention a single case in which extinction has actually taken place,* so far, that is, as our whole archipelago is concerned. This may be due in part to the imperfect investigation of our flora in former times. One of the nearest cases of extinction would seem to be one recorded by Mr. Druce, which is connected with forestal operations. A great gale in 1895 blew down large numbers of pines at Loch Tay near the habitat for a grass determined by Prof. Hackel to be the var. *borealis* of *Calamagrostis neglecta* (*C. stricta* Nutt.), and, therefore, distinct from the form which still exists in Cheshire. Mr. Druce, visiting Loch Tay, found saw-mills erected a hundred yards from the marsh where the grass grew, so that there was no apparent danger; but on a subsequent visit he found that the sawdust from the mills had been cast on the marsh and had utterly destroyed the rare grass.†

Drainage has perhaps been an even more prolific cause of local extermination than has the clearing of woodland. The reclaiming of the Fens has locally done away with many species of *Carex*, *Scirpus*, and *Juncus*, such orchids as *Malaxis paludosa*, *Liparis Loeselii*, *Epipactis palustris* and *Orchis latifolia*, *Potentilla Comarum*, and even to some extent the marsh marigold (*Caitha palustris*). The more completely aquatic species, such as the Potamogetons, may survive in such localities in the ditches constructed for drainage; and it may be possible in some cases to preserve small areas of bog nearly in their pristine condition, as has been done at Wicken Fen and on the Black Hill of Cromarty, the locality for *Pinguicula alpina*. Among our British ferns *Lastrea Thelypteris*, the Ophioglossums, and *Botrychium*, are liable to diminution by this same drainage. On even a larger scale than the drainage of our own fen-land is the reclamation now in progress in the Everglades of Florida, a vast plain covered with swamps and shallow lakes half-choked with vegetation, a subtropical analogue of our Norfolk Broads having perhaps no exact parallel in the world. This area is now being drained for the cultivation of pine-apples and bananas.‡

Agriculture has probably added many more species to our floras than has forestry, those "weeds of cultivation," mostly annual herbs with small seeds, the migrations of which form a most instructive study. Their name of "weeds" implies, alas! that they are to the agriculturist "plants in the wrong place"; and the necessary care of the modern farmer to secure his very dubious profits means that the beautiful corn-cockle (*Lychnis Githago*), corn-flower (*Centaurea Cyanus*), and others are not as common now as they were thirty years ago, and even poppies are, perhaps, more confined to railway embankments and other uncultivated margins of cultivated ground. Thus what Agriculture has given with one

* [It would seem that *Erythræa latifolia* Sm., known only from the Lancashire sandhills, is such a case.—ED. JOURN. BOT.]

† Report of Committee of Cotteswold Naturalists' Field Club in 1903, reprinted in *Nature Notes*, vol. xiv., p. 118.

‡ Mary Perle Anderson, "The Protection of our Native Plants," *Journ. New York Bot. Gard.*, vol. v., No. 52 (1904).

hand she takes away with the other. Special planting operations may do much local damage, as, for instance, the extermination of the spider-orchis by the sowing of coarse grasses, or that of *Anemone Pulsatilla* by the planting of larch on some limestone slopes.*

The extension of buildings round our towns, and even in rural situations which may happen to be localities for rare plants, is quite inevitable. We can no longer expect to find *Saxifraga granulata* at Gray's Inn, where it grew in 1640, or arrow-head, skull-cap, ladies-smock, St. John's-wort, fenugreek, and *Trifolium subterraneum* and *T. filiforme* in Tothill Fields—that is to say, practically the neighbouring site of Westminster Cathedral—where many of these species were growing in 1815; we shall not find the gipsy-wort on “ditch-banks about Piccadilly”; the grass-vetchling (*Lathyrus Nissolia*) or the flowering rush (*Butomus umbellatus*) in Battersea Fields, where they grew in 1840; or the rare *Cyperus fuscus* on Walham Green, where it lingered down to 1865. It is, in fact, remarkable that Mr. W. Clarkson Birch should have been able recently to collect one hundred and thirty species of wild flowering plants in the parish of Fulham. His collection, now at St. Paul's School, includes gipsy-wort, skull-cap, purple loosestrife (*Lythrum Salicaria*), the interesting American balsam (*Impatiens biflora*) which has spread down the Tillingbourne and the Wey since 1822, and the Peruvian *Galinsoga* which has spread so abundantly from Kew Gardens during the last fifty years.† Building has destroyed a site for the rare pink *Dianthus prolifer* on Boar's Hill, near Oxford;‡ and, by an unfortunate accident, a lovely situation on the North Downs, which happened to be the only locality over a wide district for *Herminium Monorchis*, was pitched upon for a house. It was also presumably the needs of surrounding houses that caused the Metropolitan Board of Works to desiccate with a main drain the locality at the head of the Leg-of-Mutton Pond at Hampstead, where thirty years ago I used to study *Drosera*, and where *Menyanthes* used then to flower.

Quarrying is, no doubt, as necessary as building; but most kinds of stone are obtainable in several places, so that it ought to be possible to protect from such destruction some of the most beautiful spots in England, which happen also to be localities for some of our rarest species, such as the gorge of the Bristol Avon at Clifton, the home of *Arabis stricta* and *Sedum rupestre*; the Cheddar rocks with their rare pink (*Dianthus gratianopolitanus*) and meadow-rue (*Thalictrum montanum*); and the gorge of the Wye.

If our losses by forest-clearing, drainage, agricultural improvements and extension, building and quarrying are inevitable, others are certainly not. Among the avoidable causes of loss I class the needless deruralising of rural districts, smoke, trade-collectors, and the excesses of children, tourists, and botanists.

* Report of Committee of Cotteswold Naturalists' Field Club previously quoted.

† C. J. Cornish in the *Times*, Oct. 17, 1903.

‡ Cotteswold Report previously quoted.

A recent measure for decentralising our local government seems to have created the necessity for some means of expending rates. The lighting of our country lanes by gas may be desirable; but I fail to see the necessity for replacing the turf edging of our foot-paths by stone or cement kerbs, the destruction of many a roadside strip of grass and flowers where the width of the roadway is greater than the traffic requires, and the wholesale plastering over of our hedge-banks with the mud laboriously excavated from our now formalised roadside ditches. Such trimming of the turf along Watling Street by a county council destroyed the only locality in Northamptonshire for the beautiful *Eryngium campestre*, the "Char-don Roland" of French flamboyant architecture.* No doubt employment is provided by this policy, and the rates are increased; but the beauty of our country roads is being proportionately destroyed.

I feel constrained at this point to record the damage done by golf, since this same species, *Eryngium campestre*, has been destroyed by the players near New Romney in Kent, whilst from across the Atlantic I learn that a rare *Clematis* is in danger of the same fate on Staten Island.†

In 1882 the late Professor Paley published a long and interesting list of the flowering plants then found by him on Barnes Common.‡ Barnes Common is still an open space, protected by a body of conservators from all depredators except golfers; but I very much doubt if *Teesdalia nudicaulis*, and some others among the species found by Paley in 1882, can be found there now. The common is surrounded by houses and railways, and traversed by well-drained roads, and it is exposed to an ever-increasing volume of smoke from Putney, Hammersmith, and the rest of London. The smoke nuisance is by no means merely a sentimental one. Some years ago Dr. Alfred Russel Wallace expressed to me the fear that, as it has already all but demolished the lichen-flora of Epping Forest,§ on the one side, and of Kew Gardens on the other, London smoke was killing the junipers on the more distant Surrey hills. But not only are increasing areas round our manufacturing centres being rendered barren and ugly, while the health of the community is suffering from the contamination of the air; for, as Mr. Druce has reminded me in a letter on this subject, we may well call the attention of Parliament to the fact that the very life of the buildings in which they hold their deliberations is being shortened by this same agency. It is, moreover, one that could at least be checked if even existing legislation were enforced.

We must all rejoice in the vastly increased appreciation of the beauties of the plant-world, especially by those "in populous city pent," and in the well-meant, but often misdirected, efforts of the

* G. C. Druce in the Cotteswold Report, as above.

† Mrs. E. G. Britton, *How the Wild Flowers are Protected*.

‡ *West London Observer*, February 18, 1882.

§ Rev. J. M. Crombie "On the Lichen-Flora of Epping Forest, and the Causes affecting its Recent Diminution," *Trans. Essex Field Club*, iv. (1884), pp. 54-75.

suburban amateur gardener. These have, however, created a demand which has had, and is having, truly deplorable results. The beautiful sea-holly (*Eryngium maritimum*), loosely rooted on our sandy or shingly shores, has been torn up wholesale by the roots to satisfy the artistic tastes of the towns, and has now disappeared from several of its former localities. As Darwin's work on *Insectivorous Plants* caused *Drosera rotundifolia* to be for a short time offered for sale in the streets of the City, so it may have been his work on orchids that spurred the suburban gardener to the ambitious, but almost certainly futile, effort to cultivate our native representatives of that remarkable group. Possibly from the absence of the appropriate mycorrhiza these species, even at Kew, constantly die out and require to be renewed. Within the last few years hundreds of the local *Orchis purpurea* (*fusca*), one of our most striking British species, have been uprooted on the downs of East Kent and sold—together with bunches of its blossoms—in the streets of Folkestone, and even the common *O. Morio* and *O. maculata* are beginning to show signs of diminution in that district from the same cause.* During this spring most British species of orchid were on sale in Farringdon Market at a penny a root, and none of these are the result of cultivation. The primrose and the male fern are more tolerant of London cultivation, though in its murky atmosphere and gas-saturated soil they can hardly be said to flourish, and, rather than increase, generally require frequent renewal. Thus, apart from, and antecedent to, all foolish and error-based political symbolism, the springtide glories of pale clustering blossoms and unrolling fronds have long led to a wholesale rooting-up of these species in the neighbourhood, not only of London, but also of our other large towns, by dealers who find it cheaper to steal their wares ready grown. In 1869, long before the death of Lord Beaconsfield, Messrs. Trimen and Dyer, in the *Flora of Middlesex*, write of the primrose that "it has become scarce round London from being dug up and carried away for sale"; whilst of the ferns they say that they "in consequence of being marketable have become of late years very scarce in the vicinity of London; some have been quite eradicated." *Osmunda* was last recorded in Ken Wood in 1813, and *Lastrea Oreopteris* for the last time in Middlesex in 1855; the primrose is well-nigh unknown within twenty miles of the metropolis, only surviving in strictly watched game-preserves; while its disappearance from Epping Forest is being followed, *mirabile dictu*, by that of the prolific foxglove. Miss Robinson, of Saddlescomb—a hollow in the South Downs—reports its complete extinction in that immediate neighbourhood, owing to the depredations of the Brighton hawkers;† and similar accounts reach me from Plymouth‡ and other large towns.

The case of our ferns is, however, even more serious, since there are no specific limits to the ambitions of that amateur

* Webb, McDakin, and Gray, *South-Eastern Naturalist*, vol. viii. (1903), p. 58.

† *Nature Notes*, vol. xv. (1904), p. 196.

‡ T. R. Archer Briggs, *Flora of Plymouth* (1880), p. 278.

gardener, and consequently the trade collector greedily tears up anything besides *Filix-mas*—except, perhaps, bracken—in hope of a higher price. In less than fifty years I have seen the disappearance of the English maidenhair (*Asplenium Trichomanes*) and the hart's-tongue from most of the country round London; and nowadays cheap and fast railway accommodation enables the depredators to extend the field of their operations to the more prolific, because moister, regions of the West of England. It is true that the fern wealth of Devon, Somerset, Hereford, or West Gloucestershire could better survive such depredations than the south-eastern area, which is naturally less favourable to fern-growth; but this is only a question of degree and of time, and it must be borne in mind that the men who range so far afield from London as the Devonshire lanes look to recoup themselves for their railway fares by the wholesale scale of their operations. In these cases, moreover, the actual collectors are probably mere employés of Covent Garden dealers. When we read of three men with a horse and trap carting away ten sacks of ferns each week for three weeks in succession, we can understand that a county like Devon, that depends largely on the attractions of its fern-grown lanes for the tourist, is led to take action in its own defence. In the Lake district and elsewhere men, who certainly in some cases do not cultivate ferns, constantly advertise that they are prepared to supply collections of different native species at a small price. Among these are some of the local clergy. When we come presently to consider possible remedies, I would ask you to remember that the only plants that appeal to the trade-collector are those that can be obtained readily in large quantities and are showy, and, if uprooted, easily transplanted. Ferns and primroses best answer to this description, daffodils, fritillaries, lilies-of-the-valley, and bulrushes being more commonly only gathered. Nevertheless such a collector may not always work on a large scale and may yet do much damage, as in the case of one of whom Mr. J. G. Baker informed me the other day, who, happening upon a plant of *Cypripedium Calceolus*—one of the rarest and most beautiful of British orchids—dug it up and sold it to a florist for half-a-crown as a new kind of *Calceolaria*!

The complaints from the United States are similar to our own. Here, too, it is the neighbourhood of the large towns that suffers most, and a limited number of popular showy species that are most in danger. The maidenhair fern has been exterminated from several stations near New York by dealers,* the Christmas fern (*Polystichum acrostichoides*) is said to be ruthlessly consumed by florists,† whilst in Connecticut the Hartford or climbing fern (*Lygodium*) was in such danger of immediate extermination that a law has been passed for its protection.‡ The glossy leaves of *Galax*

* Mrs. E. G. Britton, *loc. cit.*

† Mary Perle Anderson, *loc. cit.*

‡ Mrs. E. Britton, "Vanishing Wild Flowers," *Torreyia*, vol. i. (1901), p. 89; and David S. George, *The Plant World*, vol. vi. (1903), p. 160.

aphylla, now known as "Galaxy," from the South Alleghanies, have become fashionable for funeral wreaths: they are picked by the crateful, and are becoming more expensive, only too certainly a sign of diminished supply.* The fringed gentians from the Berkshire hills and their allies the Sabbatias, the favourites of the streets of Boston and Plymouth, are generally uprooted, but seldom successfully transplanted. Among the beautiful shrubs of the Heath family, not only are the native *Rhododendron* and *Azalea* stripped of their blossoms for the supply of Philadelphia, but the lovely evergreen mountain laurel (*Kalmia*) loses both flowers and foliage, like our own guelder rose (*Viburnum Opulus*), which would seem to be similarly imperilled. Last, but not least, the trailing arbutus or mayflower (*Epigæa repens*), which should be endeared to every New Englander, and which cannot be transplanted with success, has been so extensively uprooted that its delicate pink and white bells have disappeared from many parts of New York.† I mention these American complaints because in several respects the Americans, though in a new and comparatively thinly populated country, are setting us examples of how to protect our indigenous flora from such threatened destruction.

Unfortunately, too, the tourist may often have learnt from some local guide-book what is the special rarity of the district, and the greed of possession (regardless of the fact that mere rarity makes a plant neither more beautiful nor more instructive) leads him to uproot not one, perhaps, but many specimens, or to buy from ignorant and reckless peasant collectors, until such plants as our Cheddar pink and meadow-rue, or the edelweiss and other floral treasures of the Alps, may be in imminent danger of extermination.

As is so often the case, harm is more the result of ignorance or thoughtlessness than of design. In connection with the excellent nature-study movement in the United States, we not only read of seventy-five town teachers receiving a weekly barrellful of specimens; but of eighteen hundred specimens of *Cypripedium Regiæ* gathered from one spot ‡; of one hundred and fifty pitcher-plants (*Sarracenia*) sent from one bog in Massachusetts,§ and even of a circular asking for forty twigs, and adding "from one bush or tree the desired forty can be obtained"! Elementary teachers, I think, require to be reminded that for instruction in anatomy, physiology, ecology, or even systematic botany, common species are, in general, better than rarities.||

* Mrs. E. G. Britton, "Vanishing Wild Flowers," p. 88.

† *New York Tribune*, May 5, 1901, quoted by Mrs. Britton.

‡ Mary Perle Anderson, *loc. cit.*

§ Mrs. Britton, "Vanishing Flowers," p. 90.

|| [The action of the London County Council in supplying specimens seems to recognize this, as "rare plants are never taken," and other precautions are observed (see *Journ. Bot.* 1906, 175). Mr. Druce (*Fl. Oxf.* 306) says that "one year Prof. Lawson sent to Kew 3000 specimens [of *Fritillaria*] for use at the Science and Art examination at South Kensington"; and the extent to which this is now gathered and brought into Oxford and sent thence to London seems likely in time to affect its existence in the Christchurch meadows. A combination of circumstances is tending to exterminate this beautiful plant in one of its

It is, I am sorry to say, impossible to acquit botanists of deliberate selfishness in the needlessly wholesale collection of rarities. Mr. E. M. Holmes has mentioned how, when once walking over Ballard Down, near Swanage, he saw six plants of *Orchis ustulata*, and, on his return, six holes in the turf. *Orchis ustulata* does not, I believe, now occur in that district. When we hear, as I have done within the last two years, of botanists collecting a hundred whole plants of *Anemone Pulsatilla* from one locality; two hundred specimens of the rarer and equally non-variable *Trifolium Bocconi* from the Lizard; and the rarities of Teesdale in almost equal numbers; or when we hear of the wholesale collecting of every specimen seen of some new bulb in the Mediterranean region, or some new tropical orchid, we can only lament that gentlemen should be unable to rise above mere trade instincts unworthy even of a street hawker.*

I am strongly of opinion that it is inadvisable to publish in local floras, and still more so in local guide-books, localities for rarities more precisely indicated than by the name of the parish or district in quite general terms. This, with oral tradition of a select—very select—few, will amply suffice to prevent any locality being lost. The Boston Park Commission in 1896 published a flora of their parks with special localities for rarities, merely prefixing the caution:—"The public should be exhorted, if they come across such plants as these, to preserve them rigidly. The true botanist and lover of nature needs no such exhortation." I cannot but think this an instance of misplaced confidence. The Rev. H. P. Reader, the excellent Dominican botanist, who rediscovered that rare orchid, *Cephalanthera rubra*, in Gloucestershire, adopted a wise precaution when asked to show the locality to the late Sir William Guise, a grower of rare plants: he led him by many circuitous paths through the woods, taking him back by another route, so that

Buckinghamshire localities, described in the *Phytologist*, v. 119, n.s. (1861). The writer, Mr. C. J. Ashfield, says: "The field in which [it] grows is known throughout the neighbourhood, and, as I am informed, even as far as Aylesbury, by the name of the 'Crowcup Field,' and many persons walk from miles round to gather the flowers." In 1869, when we first visited the locality, which is on Lower Waldrige Farm, about four miles from Princes Risborough, in the parish of Dinton, the fritillary was abundant in at least three fields; but it is now comparatively rare, partly because of the depredations of visitors, partly because it is grazed down by sheep. Mr. Cox, of Lower Waldrige Farm, told us when we went there in May, 1903, that in some years no plants are seen, and this was the case on the occasion of our visit. The name as we heard it was "Froccup" (Frog-cup).—ED. JOURN. BOT.]

* [We fear there is only too much reason for this protest, as instances given from time to time in this Journal have shown. We were informed the other day that *Senecio palustris* was practically exterminated some years ago in one of its localities in the Norfolk fens by a botanist from London, who collected it in vast quantity; and we remember to have heard that a visitor to the same botanist's herbarium was scandalized at seeing sheets containing hundreds of specimens of one of the small Teesdale rarities. Of course this is not science but a mischievous application of the instinct for collecting, yet it seems impossible to convince folk of this; we hope, however, that Mr. Boulger's protest may have some effect.—ED. JOURN. BOT.]

the old gentleman, though he saw the plant growing, was not likely to find it again. Another plant-lover in the same district, Atkins, whose name is familiar to cyclamen-growers, adopted another expedient. A neighbour collector, named Wintle, remarked to him that some of the less common plants of the neighbourhood—bee-orchids, I think—seemed to be suffering from the wholesale attacks of some new enemy, whether bird or slug he did not know, by whom all their flowering-shoots were nipped off. "Oh," said Atkins, "I did that to prevent your finding them." However advisable in the case of bulbous or rhizomatous plants, this plan is, as I have said, likely to be harmful in the case of orchids.

HARRY MARSHALL WARD, F.R.S.

THE death on August 26th of Prof. H. Marshall Ward has removed all too soon one of the most strenuous workers among British botanists. He was closely identified with the remarkable re-awakening of anatomical and physiological study in the land that gave birth to both of those branches of the science; consequently, in writing some brief account of his active botanical life, it is inevitable that it should fall in some degree into the form of an historical sketch for the country at large. And if what follows is not exactly a biography of Ward himself, the reason is that he was personally so intimately concerned with, and helped so much to mould, what may properly be called a renaissance.

The period of this movement was initiated by the translation of the text-book of Sachs, in 1875. At that time British botany was practically identical with the systematic study of the phanerogams. At Kew, Hooker, Bentham, and Oliver formed a triumvirate without rivals elsewhere; it was the period of production of the *Genera Plantarum*, that monumental work to which all subsequent systematists have been so much beholden. But outside systematic botany the science was virtually dead in Britain, except for some few individual efforts. Darwin was privately at work at Down, taking his own course; while Sir Joseph Hooker had always been a student of the living plant. Among teachers, Thiselton Dyer, in Dublin, had begun some years before to awaken interest in laboratory observation, and in Edinburgh J. Hutton Balfour used to give microscopic demonstrations to his students. But even there, as elsewhere, British field botany was the staple of university work, and for the undergraduate at large, laboratories were not yet.

It was into this arena that Ward entered in 1875, with all the advantages which follow from being on the crest of a wave of change. For he came to South Kensington as a student to one of the first of those summer classes for teachers which had just been founded under the direction of Huxley. The course of 1875 was conducted by Thiselton Dyer, assisted by Vines. The former was fresh from the proof-sheets of the translation of

Sachs' text-book, and the course consisted largely in personal observation by each student of living examples of organisms therein described. There was all the spirit of a new enterprise about the work; in fact, just those conditions which would catch the fancy of an enthusiastic and able student. It is no wonder that Ward, with his natural powers thus stimulated, should attract the attention of his teachers. A scholarship at Christ's College, Cambridge, was secured by him in the following year, and his definite career as a botanist was thus opened.

It was then I first met him, as a member of the practical class in botany carried on by Vines in a small room in the Physiological Department at Cambridge. The class was a personal effort of Vines, rather than any outcome of university organization. We can never expect to see again exactly that enthusiasm which surrounded the little successes of that small band. Almost daily we felt we were seeing objects, described it is true from German laboratories, but not yet seen by English eyes. This class was part of a real awakening, and by its means confidence in their own powers of observation was established in a group of workers, who handed it on to others, and thus established in the country the practice of personal laboratory observation even for the most elementary student. This was not so easy of achievement as it is to describe after the event: and one still remembers the dilating of the nostril and missionary aspect of Ward as he spoke of "the cause."

After his First-class in the Natural Science Tripos of 1879, Ward travelled. First he worked in the laboratories of Sachs and of De Bary, his attention being already claimed by the Fungi, a group from which he never broke away. This led to his acting for two years as Government cryptogamist, investigating the coffee disease in Ceylon, a period which widened his scope, and fitted him peculiarly well for his later office as professor at Cooper's Hill. Returning in 1882 he took up duty as assistant in Botany at Owens College, Manchester, but left it in 1885 for the Indian Forestry School at Cooper's Hill, where for ten years he was Professor of Botany. His last move was in 1895 to the Chair in Cambridge, which engaged him for the rest of his active life. A Fellowship of his old college, and subsequently of Sidney Sussex College, Fellowship of the Royal Society (1888), a Royal Medal (1893), and D.Sc. *honoris causa* from Victoria University (1902), were among the well-merited recognitions that fell to him.

It will not be necessary here to enumerate Ward's contributions to the published literature of the science. This has been efficiently done elsewhere (*Nature*, Sept. 13th, 1906). It is rather with the spirit of his work that I wish to deal. Before all things Ward was an observer: in this respect day and night were to him alike, and he followed his living organisms the clock round with a tenacity which can still be traced between the lines of his papers, and be appreciated even by those who never saw him personally at work. For him it was always the problem of the living, not of the dead organism; and inevitably his interest was deeper in ontogeny than in phylogeny.

His close observation led to a certain defect of style. His papers were apt to read rather like laboratory notes, than as the outcome of literary skill; in fact, their prime merit became a blemish. He busied himself constantly with questions that were nascent at the time. His first paper on *Gymnadenia* touched the current problem of origin of the embryo sac. His papers on Root-tubercles, on Sexuality in Fungi, on the effect of light on Bacteria, on the Ginger-beer Plant, and on the Brown Rusts: all handled on a basis of personal enquiry some moving question of the day. Perhaps the best, as it was probably the most costly, of his papers was that on a Lily Disease (1888), in which he established the ferment-action of a plant parasite. He spent his whole summer upon it, and I remember visiting him at Egham, and remonstrating with him for not taking his proper holiday; that winter he broke down. His health was never strong, and one cannot help seeing that the dominant enthusiasm which brought him to the front, tended also to shorten his days.

Apart from Ward's published work, his supreme effort was the establishment of the Botany School in Cambridge. This involved not only the organization of a most efficient staff, but all the burden of designing, detailed fitting up, and entering into a large departmental building. It is only those who have gone through this, together with the moving of collections, who know how exacting and apparently unremunerative such work is. This Ward saw completed. And now, when the reward should be his of watching a growing school as it reaps the advantage of his work, he has been removed. To those who took part with him in the renaissance in the study of the living plant in Great Britain, his death appears as the first break in the circle; a reminder that thirty years cannot count for nothing.

In conclusion, a comparison may be made between the position of botany in Britain in 1876 and in 1906; that is, at the beginning and the end of Ward's active part in it. At the earlier date the attention was largely fixed on classification of Phanerogams, based upon the observation of dry specimens. At the later date the living plant is put first, and the interest has shifted from the Phanerogams to organisms lower in the scale. There is indeed a danger, not nascent but actually with us now, of a swing of the pendulum to an opposite extreme, with the consequence of almost as lop-sided a position as that of thirty years ago. The active investigators of this country have mostly left the Phanerogams aside; the lower forms claim the prominent place, and especially those whose remains are preserved in fossil form. The extraordinary success which has followed the strenuous examination of them by a band of ardent workers has placed Great Britain in the forefront of palæobotanical enquiry. This, combined with the spreading of interests over the fields of physiological and applied botany, has depleted the ranks of phanerogamic botanists; and now it comes to this, that the empire which embraces the largest share of the earth's surface is inadequately supplied with young students of the flowering plants. It is for the universities, in co-operation with

the great herbaria of Kew and the British Museum, to set this right. Ward himself, in his later writings on trees and grasses, seems to have felt the necessity of a return from the extreme position of the present time. Certainly it presents a strange antithesis to that which he saw when, as a young student, he first entered the field of botany. Lastly, in 1876, Great Britain was far behind the Continent in efficiency of laboratory work, and most of us continued our education abroad. To-day that accusation will not lie, and a visit to a foreign laboratory is not essential now, as it was a generation ago. A glance over recent volumes of the *Annals of Botany* (a journal which Ward had a hand in from the first), or over the more august pages of the *Philosophical Transactions*, will show that this country is doing its duty in this sphere. Ward's own teaching and example have contributed not a little to this end, and it is clear that he left botany in Britain in a very different state from that in which he first found it.

F. O. BOWER.

A NEW SPECIES OF LESSONIA.

By A. & E. S. GEPP.

WHEN treating of "Antarctic Algæ" in this Journal (April, 1905, pp. 105-109), we described *Lessonia grandifolia*, a new species characterized by the great length of its fronds and the comparative lack of development of its stalk. We had received specimens from two stations in the Antarctic region: (1) complete plants of enormous size from Cape Adare and Coulman Island, collected by members of the staff of the 'Discovery'; (2) fragments of an apparently similar specimen from the South Orkneys, collected by Mr. Rudmose Brown, of the 'Scotia.' Our description of *L. grandifolia* (*op. cit.* p. 105) was drawn up on the fine and complete plants of the 'Discovery,' and not on the 'Scotia' specimen, since the latter was too fragmentary for the purpose. In other words, the type of *L. grandifolia* is the 'Discovery' plant. The cell-structure of the 'Scotia' plant, however, being clearer than that of the 'Discovery' specimens, seemed to lend itself better to illustration, and was figured (*op. cit.* tab. 470, fig. 6). At that time we regarded the specimens as belonging to one and the same species, well distinguished from all other members of the genus by its habit, its large unsplit laminae, and its proportionally insignificant stem, which exhibits no signs of annual thickening. Subsequent investigation has shown us that we were too hasty in forming our opinion, and we are now compelled to limit our description and the name *L. grandifolia* to the 'Discovery' plants, and to separate off the 'Scotia' plant as a distinct species on the score of its internal structure. To this new species we give the name **L. simulans**, with the following description:--

Planta incompleta. Frons laminarioidea ut in *L. grandifolia*,

stipite complanato ancipite suffulta, simplex, lanceolato-linearis, longa, lata (12.5 cm. plusve), marginibus integerrimis. Laminæ substantia pergamentacea vel coriacea, e stratis tribus composita; cellulis corticalibus monostromaticis quadratis granuloso-obscuris; subcorticalibus oblongis parenchymaticis in circa 6-7 series dispositis; medullaribus elongatis angustis strictis 9-10-seriatis tubulos perpaucos subinfundibuliformes vaginâ e cellulis parvulis compositâ vestitos foveis. Cætera desunt.

Syn. *L. grandifolia* nobis in Journ. Bot. (1905) p. 105, tab. 470, fig. 6, pro parte.

Hab. South Orkneys, Scotia Bay, near surface, Apr. 1904, R. N. Rudmose Brown.

Whether or not this species differs essentially in habit or external characters from *L. grandifolia* we are unable to say, the material supplied being incomplete. But on the evidence of the internal structure, there is no doubt that the 'Scotia' plant is quite distinct from the type of *L. grandifolia*. The most obvious difference is found in the medulla of the lamina. In *L. simulans* the medulla is a very pale brown tissue of elongated cells with very few ensheathed trumpet-hyphæ among them; whereas in *L. grandifolia* the medulla is colourless and composed of hyphæ mostly longitudinal, laxly juxtaposed, and interspersed with numerous ensheathed trumpet-hyphæ disposed in a wide median band. Another point of difference is found in the cortex, which in *L. simulans* is monostromatic, and composed of quadrate cells with granular contents (not rotundate and densely obscured, as erroneously represented in tab. 470, fig. 6, of this Journal). In *L. grandifolia* the cortex is composed of short vertical crowded rows of small brown cells.

Further details, with figures of the structure of both species, will be published shortly in the official report of the scientific results of the National Antarctic Expedition.

SHORT NOTES.

MATRICARIA DISCOIDEA L.—This alien has been found in Bucks near Slough, in Berks between Twyford and Hurst; and in 1899 I gathered it at Aber, in Carnarvonshire, and in 1904 at Ranworth, in Norfolk. This year I saw it between Wybonbury and Crewe, in Cheshire, and abundantly in and about Westport, in Ireland. The plant therefore appears likely, as is the case of *Erigeron canadense*, to become a frequent naturalized species. I strongly suspect *Sisyrinchium angustifolium* and *Juncus tenuis* belong to the same grade. The former has recently been found growing near the golf ground near Burnham, in Somerset, by Mr. C. F. Vincent, and also in a park at Gilgarrow, in Cumberland.—G. CLARIDGE DRUCE.

CORNISH RUBI.—The Rev. W. Moyle Rogers has recently kindly examined, and with his usual courtesy and thoroughness reported on, a large parcel of Rubi specimens gathered by me during July

and August, and I am now able to announce several county and vice-county records. The following are additions to the Cornish list:—*Rubus rosaceus* Wh. & N. subsp. *infecundus* Rogers. Lane near College Wood, Penryn. This subspecies was erroneously included in my *Tentative List of Cornish Plants* (1902).—*R. hirtifolius* Muell. & Wirtg. var. *mollissimus* Rogers. Ponsanooth, Carnmarth Hill, and Connor Downs.—*R. Griffithianus* Rogers. Sparingly on a field hedge at Ponsanooth.—*R. pallidus* Wh. & N. A few bushes on the Cairns, Ponsanooth.—*R. Marshalli* Focke & Rogers var. *semiglaber* Rogers. A goodly number of bushes at the top of the Cairns, Ponsanooth. This was recorded in *Journal of Botany* for April, p. 131, as *R. horridicaulis* P. J. Muell.—*R. radula* Weihe. Connor Downs, near Hayle. Previously all records for this species were placed under the subspecies *anglicanus* Rogers.—*R. Lejeunei* Wh. & N. var. *ericetorum*. From Goonorman Wood, St. Gluvias. Mr. Rogers refers it to forma *umbrosa*, and designates it “rather weak.”—Records for v.-c. 1 are:—*R. macrophyllus* Wh. & N. subsp. *Schlechtendalii* (Weihe). Field near Mabe Reservoir; Ponsanooth; woods at Kea Playing Place, near Truro; “panicle more pyramidal than usual. A beautiful form which occurs near Plymouth.”—*R. cariensis* Rip. & Genev. Bissoe, Ponsanooth, Goonorman Wood.—*R. dumetorum* Wh. & N. var. *ferox* Weihe. Greensplat, in Gwennap parish.—*R. affinis* Wh. & N. var. *Briggsianus* Rogers. Tresamble Bottoms, near Ponsanooth. Previously recorded only for the extreme eastern portion of the county.—*R. gratus* Focke. Tresamble Lane, Perranarworthal. Not previously known west of Pillaton Down and Clapper Bridge.—*R. corylifolius* Sm. var. *cyclophyllus* (Lindeb.). Sea-cliffs at St. Ives; an extension westward of this variety of about fifty miles.—FRED. HAMILTON DAVEY.

TWO OLD CHESHIRE RECORDS CONFIRMED. — *Inula Conyza* DC. This plant is recorded in the Supplement to Dickinson's *Flora of Liverpool*, 1855, on the authority of J. Harrison, as growing “between Sutton bridge and Sutton lock”; the record reappears in the *Flora of Liverpool*, 1872, with the suggestion that recent confirmation would be desirable, but it finds no place in Dr. Green's later *Flora*. In the *Flora of Cheshire*, Lord de Tabley reproduces John Harrison's record, and adds, “An error, or at any rate requires confirmation.” As there is no record of this species as a Cheshire plant in *Top. Bot.* ed. ii., or in Mr. Bennett's Supplement thereto, it may be as well to state that I saw it growing in some quantity, for several years, in the precise station indicated by John Harrison, and that when I last visited the spot—in 1899 or 1900—the plant was as plentiful and conspicuous as ever. I quite believe that it is native here; it grows on a steep bushy declivity on the side of the Weaver Canal a little below Sutton Lock, and it is quite outside the zone of the usual canal-bank aliens, which are so abundant hereabout. I have not seen it elsewhere in Cheshire, but have found it plentifully in William Harrison's recorded station “above the Dungeon at Hale” (Supp. Dickinson's *Flora*). This station is about six miles away, and is on the Lancashire side of

the Mersey.—*Lathyrus sylvestris* L. The following record of this plant appears in Dickinson's *Flora of Liverpool*, 1851: "Sutton Bridge, Frodsham. John Harrison, 1850." The *Flora of Liverpool*, 1872, reproduces the record, with the remark that "Mr. J. F. Robinson fails to find this at Sutton Bridge"—a curious lapse on his part. Lord de Tabley, in reproducing the above statements, regards the plant as "misrecorded," and gives no other Cheshire station. In his account of the distribution of *Hypericum hirsutum* in Cheshire (*Flor. Chesh.* p. 59), he says, "I find that Dr. Dickinson questioned the genuineness of a good many of John Harrison's records." I am glad, therefore, to be able to confirm the original record of John Harrison. On August 30th, 1891, I found the *Lathyrus* growing among some bushes on the right bank of the Weaver Canal, just below Sutton Lock. There was one large patch of it, and I fortunately saved a specimen. I can give no opinion one way or the other as to its status in this locality, as I only saw it once. This plant is not given as a Cheshire species in either *Top. Bot.* ed. ii., or the recent Supplement. It should be noted that Dr. Green, in his *Flora*, prints Dickinson's old record, and also records it from Wallasey sand-hills, 1894. It would seem that John Harrison's records are not so untrustworthy as has been generally supposed.—C. R. BILLUPS.

NORTH DEVON ALGÆ.—Last month I found on the shore at Combemartin two parasitic algæ, which Mr. E. M. Holmes identifies as follows:—*Gonimophyllum Buffhami* Batt. on *Nitophyllum laceratum* Grev., and *Actinococcus peltaformis* Schmitz on *Gymnogongrus norvegicus* J. Ag. Both these are new records for North Devon. Of the latter species Mr. Holmes remarks: "I have no doubt it occurs on the plant in most places, but has been overlooked until recent years."—C. E. LARTER.

PRUNELLA LACINIATA IN SURREY.—Some time ago I saw, year after year, growing among the turf at a spot on the higher part of the North Downs above Clandon, a form of *Prunella*, which I considered to be a departure from type *P. vulgaris*, and probably referable to a continental variety. This I laid in my herbarium as *P. vulgaris* L., "a form with white-cream flowers and pinnatifid upper leaves." Seeing the great resemblance of my specimens with the plate and description of *P. laciniata* L. in the last issue of this Journal, I submitted my plants to Mr. J. W. White, who writes: "You are quite right in believing your specimens of *Prunella* to be *P. laciniata*. I am much interested in seeing your sheet of good examples. These confirm my idea that the plant is really well distributed in the country on suitable ground—elevated calcareous pasture." My specimens were gathered at a locality a little below 600 ft. in altitude, the downs thereabouts being uncultivated, and producing the usual chalk-soil flora, including orchids.—CHARLES E. BRITTON.

HIERACIUM UMBELLATUM L. var. CURTUM Linton in CORNWALL.—To this variety the Rev. E. F. Linton refers specimens collected near Wadebridge in August last by Mr. L. A. M. Riley, and at

Porth Towan early in September by myself. The Wadebridge plants range from nine to fifteen inches in length, while none of the Porth Towan ones, which grew on short turf in a very exposed place by the sea, are more than two inches high. In Linton's *British Hieracia*, Abersoch and Morfa Bychan, Carnarvon, are the only British stations cited for this very striking variety. The two Cornish localities are on the north coast.—FRED. HAMILTON DAVEY.

FLORA OF BRISTOL.—I have in preparation, and hope to publish in a year or so, a new edition of my *Flora of the Bristol Coal-fields*. So much additional information has been noted in the years that have gone by since that tentative sketch was issued by the Bristol Naturalists' Society, that the book may now be deemed entirely out of date. A re-written *Flora* is said to be wanted for several reasons; to me not the least important one seems to be this, that almost every botanist in the country comes to Bristol at some time or other in search of local rarities, and the trained eye not unfrequently notices something which appears to be of importance. But at present the accessible printed records do not suffice to show whether a discovery be original or not. This point is illustrated by the "Bristol Notes" published in the November number of the *Journal* (p. 395); that the facts there mentioned had been long known locally could only have been ascertained by making inquiry on the spot. I shall be sincerely grateful to any botanist who may have rambled in this neighbourhood if he will communicate to me matters of interest concerning flowering plants that may have arrested his attention. Some of my distant friends, on their incursions, have given me valuable help. The district flora is very rich; its treasures, as recent events show, are many. Some have remained long unregarded, and even now others may be awaiting disclosure until keener eyes than mine shall rest upon them.—JAMES W. WHITE.

PARIETARIA OFFICINALIS L.—Some years ago it came under my observation that the stamens of our common *Parietaria* showed peculiar action, to which I could see little or no reference in our British Floras; but I put off writing about it in hope of getting the process illustrated. Before maturing, the stamens form a compact group, the four anthers touching one another in the form of a short broad cross. After maturity, the filaments are extended laterally, having apparently grown considerably; they were nearly a quarter of an inch long, and transversely streaked with wrinkles of light. Watching the flowers, which seemed nearly ready in sunlight, I caught sight of an anther flying outward with a sudden spring, and the same moment a puff of pollen leaving the exploded anther in the direction away from the centre of the flowers. The filament is at first curved inward over upon itself, like an arm doubled up with the fist on the shoulder; then suddenly thrown out at full length. These staminate flowers being barren, the object is to scatter the pollen towards pistillate flowers around. I watched this process again and again, sunlight being required to start the stamen into action. The fact of the anther bursting simultaneously with the spring of the filament struck me as very remarkable.—E. F. LINTON.

NOTICES OF BOOKS.

How to Find and Name Wild Flowers ; being a New Method of Observing and Identifying upwards of 1200 Species of Flowering Plants in the British Isles. By THOMAS FOX, F.L.S., with an Introduction by F. E. HULME, F.L.S. Illustrated by the Author. 8vo, pp. xvi, 265. Price 1s. 6d. ; cloth, 2s. Cassell & Co.

THE question is constantly asked by beginners, "What is the best elementary botany book?" This usually means, "By the aid of what book can I most easily ascertain the names of wild flowers?" which is not always the same thing. There are excellent handbooks which presuppose some knowledge of botany, and perhaps those which give the least trouble are illustrated ones, as it is apparently so much easier to run down a plant by reference to illustrations than to master the technical expressions which are necessary before any classified list can be followed; but in illustrations colour is so often very badly represented, and unless they are otherwise very well executed and so render the price of the work prohibitive, the danger of error is greater than when some sort of written description is followed.

In the book above named we have a cheap and excellent work drawn up on an entirely new plan, which we think is likely to prove very useful. The classification is based upon five cardinal points—1st, the season of flowering; 2nd, the colour; 3rd, size of flower; 4th, its prominent characteristics; 5th, its habitat. It is no doubt easy to find defects in all systematic arrangements, but less easy to suggest improvements. To our mind the primary defect in the author's system is that plants are arranged under the months in which they *begin* to flower. Now many common species flower all through the summer—some, indeed, almost the whole year round—and the novice who began his studies in the summer holidays might have to look back through several preceding months before locating his find. The author minimizes the labour of wading through every species which flowers in each month by grouping the flowers, first under their colours and then under their size. For example, supposing a Rose Campion to be gathered in July, we first turn to p. 148, where the July flowers with "rose or pink" flowers appear, and find three species with "medium"-sized flowers, none of which will fit our specimen. Turning back to June, the colour group "rosy-pink" contains seven species with "medium" flowers, and the tyro might be in danger of considering the Red German Catch-Fly (*Lychnis Viscaria*) to be the name he sought, though the characters given—"root-leaves very narrow lanceolate; flowers almost sessile; rocks; 6 to 10 inches; rare,"—should save him. Turning to May, only two species appear with "red or pink, medium" flowers, which would doubtless be at once rejected by their characters. In April only two appear, of which one, *viz.* Herb Robert, is discarded from its having fern-like leaves, the other being Rose Campion.

The colour grouping may perhaps have been overdone, for we all know how folk differ in their names for the same colours. Moreover, the colour of flowers varies greatly, and is often difficult

to describe. For example, we should hardly think of looking for Knotted Figwort in the group with "dull greenish" flowers, nor for a characteristically-coloured specimen of Knot-grass, e.g. *Polygonum rurivagum*, under "greenish white and pink," though no doubt the average colour of *P. aviculare* (which of course is not split into its segregates) is as described by the author.

Notwithstanding these criticisms, we strongly recommend the book. As the author says in his preface, "it endeavours to avoid equally the dry-as-dust technicalities on the one hand, and scrappy ephemeral almost futile method on the other." The way in which attention is drawn to the prominent characteristics of each species is decidedly clever, and though of course a few indispensable technical terms are used, they are not sufficient to alarm the most nervous, and are fully explained in the introduction. Part II. at the end of the book gives a classified list of the Latin names of all the species under their proper orders, with a short description of each division, order, and genus, the earliest dates of flowering, and the range or distribution of the species. We cannot see that the author explains the meaning of the numbers after the name of each species in Part II.; they are evidently mainly the *London Catalogue* numbers, but in many cases they do not agree with those of the ninth edition. Here and there we suspect that the author has committed the error of adding the numbers of several segregates in the *London Catalogue* to make that of the aggregate shown in his list; consequently many plants are said to grow in more vice-counties than exist! But this is quite an unimportant error, and the work has much to recommend it.

A. H. W.-D.

A Text-book of Fungi, including Morphology, Physiology, Pathology, Classification, &c. By GEORGE MASSEE. Pp. xi and 427; 141 figs. Price 6s. London: Duckworth & Co. 1906.

If any apology were needed for issuing, at the present day, a text-book on Fungi, Mr. Massee has supplied one in the statement that meets us in the forefront of the volume: "A knowledge of the structure and life-history of the fungi is now required of those who seek a degree or diploma in agriculture and forestry in the universities and colleges. The present volume is arranged as a text-book for educational use, and it is written on the lines required by the Board of Agriculture." Such a text-book was seriously needed by students, and, as its field is unoccupied, there is no rival to dispute its welcome. Fungi are not an isolated group of plants; they are always necessarily in intimate association with other members of the vegetable kingdom, either as parasites on living plants, or as saprophytes on plant remains, timber, &c. All therefore who desire to study practical or applied botany, whether as gardeners, agriculturists, or foresters, must add to this knowledge an acquaintance with fungi.

The subject, under Mr. Massee's treatment, follows the outlines he has laid down in his title-page. First he treats of the morphology and physiology of the group; then of their parasitism, which comes under the section headed Pathology; and, finally, a survey

is made of the vast series of plants, and their classification is outlined and explained. Under the first section, the general anatomy of fungi, their relation to environment and to each other, and their physiology and reproduction are fully discussed. The author gives a summary of the different results arrived at by various writers on cytology and sexuality, and of their somewhat conflicting views. He accepts the discoveries that have been made by Harper, Blackman, Christman, and others, but reserves to a final chapter his "personal views on phylogeny." He there states that, according to his view, the oomycetous section of the *Phycomycetes*, with the well-marked oogonia and antheridia, are descended from some *Vaucheria*-like alga; that the zygote is but a modification of the same method of fertilization; that the conidial or aerial method of reproduction appeared early as an adaptation to dry land conditions; and that the *Ascomycetes* have descended from the conidial form. He holds that "both the vegetative and reproductive portions are built up from the hyphæ originating in the conidial condition of the *Phycomycetes*." The *Basidiomycetes* develop from conidial forms of the *Ascomycetes*; there is no question of sexuality in that group. In this scheme Mr. Masee refuses to allow any importance to the trichogyne as a link with the *Florideæ*; he dismisses it as "an elongation of the oogonium," and requires the reappearance of sexual organs in the *Ascomycetes* after these had been dropped by their conidial progenitors.

Brefeld's system of classification, which has always been looked on as a good working system, has been followed with some modifications. The author says in his introduction that the "value of a systematic classification depends entirely on its practicability. Its primary object is to enable us to identify species correctly." This is scarcely the whole truth; we want a scheme that represents to us a natural system, as well as a ready method of identification. Morphological characters are always of the first importance in systematic work, but cytology and physiology are welcome aids in indicating the characters that are of phylogenetic value. Recent researches in yeast-forms have proved that the endospores which have been considered as primitive ascospores may be developed in the life-cycle of a fungus that at another stage produces a true ascus fruit. The morphological evidence in this case must be set aside, and the yeasts removed from the *Ascomycetes* to find their affinity in some "Fungi imperfecti."

The text-book is packed full of information, well arranged, and well indexed, and should prove invaluable to the student. Some slips occur, as, for instance, on p. 279, where the "Fungi imperfecti" are said to be "usually considered as hitherto unattached forms of the *Pyrenomycetes*." The author should have added, "or the *Discomycetes*." There is at least one *Gloeosporium* that is allied to a *Pseudopeziza*, and there are various *Hyphomycetes* connected with other *Discomycetes*.

The illustrations are numerous and instructive; they may lack the distinction that is gained by employing a heavier type of glazed paper, but there is ample compensation in the agreeable lightness of the book.

A. L. S.

BOOK-NOTES, NEWS, &c.

At the meeting of the Linnean Society on November 1st, Mr. George Talbot exhibited abnormal specimens of *Equisetum maximum* from Broxbourne, Herts, where they grew on dry ground and in a narrow area. They were characterised by the development of a fruiting zone on an otherwise typical sterile stem; one specimen showed a prolongation of the stem bearing branches beyond the cone; another showed an extremely reduced cone borne on the summit of a branch. Sir Dietrich Brandis spoke on the structure of Bamboo leaves. He explained that while the leaves of other grasses exhibit a great variety of structure, those of Bamboos are exceedingly uniform. In bud they are always convolute; they all have in the upper epidermis, alternating with the longitudinal nerves, bands of large bulliform cells known as motor-cells. In most species these motor-cells are filled, entirely or partially, with solid bodies of silica. Between the bands of bulliform cells and the longitudinal nerves, Bamboos (with one exception as far as known, *Chusquea pinifolia* of South-east Brazil) have large apparent cavities, which are completely filled by large flat thin-walled cells, lying one over the other, like the leaves of a book. This tissue is entirely different from that which, in a young state, fills the cavities in the leaves of *Glyceria aquatica*, *G. fluitans*, and other aquatic grasses. The species placed by Dr. Stapf in *Flora Capensis* in the new tribe *Phareæ* have, as far as known, leaves with a structure similar to Bamboo. Prof. A. J. Ewart read a short paper on the systematic position of *Hectorella cæspitosa* Hook. f., which had previously been regarded as belonging to the *Portulacæ*, but which the author suggested might be transferred to the *Caryophyllacæ*.

MR. A. C. SEWARD has been elected to the professorship of botany in the University of Cambridge, in succession to the late Prof. Marshall Ward. Since 1890 Mr. Seward has been lecturer in botany to the University. He was president of the botanical section of the British Association in 1903, and his name is on the list of those recommended to the Fellows of the Royal Society for election on the Council of that Society. He has published several books, including *The Wealden Flora* and *The Jurassic Flora* (British Museum Catalogues) and the first volume of a text-book on fossil plants for students, and he was joint editor with Mr. Frank Darwin of *More Letters of Charles Darwin*, published in 1903.

IN *The Naturalist* for August are printed extracts from four interesting letters written by Richard Richardson to Samuel Brewer in 1727. The references to the finding of *Epimedium alpinum* and of *Specularia perfoliata*—the latter “common in the streets and upon the dunghills [of] Bingley town”—should be read in conjunction with Brewer’s and Richardson’s letters of the same year in Richardson’s *Correspondence*, pp. 278–281.

THE latest issue (vol. iv. sect. i., part 3) of the *Flora Capensis* contains the conclusion of the *Ericacæ* (N. E. Brown) and the

orders *Plumbagineæ* (C. H. Wright), *Ebenaceæ* (W. P. Hiern), *Primulaceæ*, *Myrsineæ*, and the beginning of *Oleaceæ*—the three last “by W. H. Harvey with additions by C. H. Wright.” In the *Ericaceæ* Mr. Brown describes the genera *Aniserica* and *LeptERICA*, already diagnosed in the clavis to the order issued last year, restores Klotzsch's genus *Coccosperma* and establishes a new one—*Eremiopsis*, founded on a plant referred by Bentham to *Fremia parviflora* Kl., but totally different from that species in structure: the last two do not appear in the clavis, which will thus have to be revised.

MR. J. M. WOOD, of the Natal Botanic Gardens, is preparing a list of Natal plants which will be published shortly in the *Transactions of the South African Philosophical Society*.

THE Board of Agriculture issues from time to time leaflets dealing with any question of urgent importance to agriculturists. One of the most recent—Leaflet No. 174—describes the tree root-rot, which is caused by *Armillaria mellea*, one of our commonest toadstools. Like many other fungi, it is a wound parasite, and can only enter the tree by some cut or abrasion of the bark. When once the filaments of the fungus have penetrated into the tissues of the root or the base of the trunk, they spread round the tree between the bark and the wood, and the total destruction of the tree is only a matter of time. The writer advises that the toadstools should be gathered and carefully buried. They live on or about the base of old stumps, and send out runner-like rhizomorphs, which creep through the soil and attack other roots or trees.

THE botanical survey of the country requires that every neighbourhood should have its list of plants. Mr. J. F. Rayner has just done this service for the fungus flora of the New Forest. He has incorporated lists already made by various societies and private collectors, and has added to them the results of his own gatherings. A tract of rich and ancient woodland, such as the New Forest, should be peculiarly rich in fungus forms. Mr. Rayner gives a record of five hundred and seventy species; but he does not claim anything like completeness. While the larger fungi are well represented, there is a lamentable falling off in the smaller forms—the minute *Discomycetes*, “fungi imperfecti,” and *Uredineæ*. The last represented by one *Phragmidium* and one *Uredo*: hence we foresee many additions to the New Forest list of fungi.

WE have received from Messrs. Cassell the first volume (price 6s.) of what is rightly termed an “entirely new edition revised throughout and enlarged” of Mr. Boulger's *Familiar Trees*, which in its original form obtained a wide circulation. The volume contains descriptions and illustrations (in colour and from photographs) of nineteen trees of very various families and characters, including one—the Tamarisk—which is more familiar as a shrub than as a tree, and another—*Clematis Vitalba*—which can hardly claim the title. A special feature in a popular book is presented by the illustrations from photographs of microscopic sections of woods and pine-needles; these, as well as a large number of the other pictures,

first appear in this edition. The uncoloured plates from photographs give an excellent notion of the object depicted; the coloured ones representing the whole tree are sometimes less satisfactory—that of the Mountain Ash, for example, conveys the notion of bearing single apple-like fruits and the colour is not satisfactory. The letter-press is, as we should expect, carefully done and really informing, and in this is a great improvement upon most popular books of the kind. We note that the title-page bears no date—an omission frequently to be observed in Messrs. Cassell's books.

A NEW periodical—*Orchis*—the brief title of which sufficiently expresses its scope—is being issued from Berlin, under the editorship of Prof. Udo Dammer. It is a handsome folio, well printed as to text and containing plates which, from their size, are capable of doing justice to their subjects. The interest of the periodical seems to be mainly horticultural, although the numbers before us contain contributions by G. Volkens, R. Schlechter, E. Pfitzer, E. de Wildeman, F. Kränzlin, and other botanists. The plates represent some of the interminable and to the ordinary eye indistinguishable forms of *Cattleya*, *Lælia*, *Oncidium*, and the like, which seem to be invented solely for trade purposes; from a botanical point of view they cannot be regarded as useful or interesting, but they are well executed and will no doubt please orchidophilists.

THE *Proceedings of the Linnean Society* for 1905–6 contains an exceedingly interesting series of (eight) portraits of Linnæus, with descriptions by Mr. Carruthers, who in 1889 presented to the Society the results of his investigations into the portraits which formed the subject of his presidential address in 1889 and was published in the *Proceedings* for that year. The reproductions are from photographs of all the authentic portraits, and these photographs, with his collection of other portraits, have been presented by Mr. Carruthers to the Society. The 23rd of May next year is the bicentenary of Linnæus's birth, and we would suggest to Mr. Carruthers that a re-issue of the portraits in a separate publication, with a full list and description of the various reproductions and their modifications, would interest many who may not be Fellows of the Linnean Society, but who might like to possess so interesting a collection.

THE University of California has received by donation the herbarium and botanical library of Mr. and Mrs. T. S. Brandegee, of San Diego. The herbarium is one of the most important in the West, since it contains something over 100,000 sheets of carefully selected plants, mostly representative of the Mexican flora, which for many years has been Mr. Brandegee's chosen field, and of the flora of California and neighbouring States, which has received careful treatment at the hands of Mrs. Brandegee. It contains the sole remaining duplicate types of many species, the originals of which were lost in the recent fire that destroyed so large a portion of the California Academy of Sciences Herbarium, as well as the types of practically all the new species described by Mr. and Mrs. Brandegee themselves. Among the noteworthy sets represented

are Bebb's willows, Parry's *Chorizanthes*, a majority of the Mexican sets distributed by Palmer, Pringle, Lumboltz, Purpus, &c., and a selection of types and duplicate types from the Orcutt and Cleveland herbaria. It is probable that no other herbarium contains so nearly complete a representation of the North American *Boraginaceæ*. It is also rich in *Mimulus*, *Eriogonum*, and other groups in which Mrs. Brandegee has been particularly interested. The University Herbarium, as now enlarged, numbers approximately 250,000 sheets, a majority of which are mounted in permanent form. The whole collection is available for study, and occupies fire-proof quarters in one of the buildings recently erected on the University campus. Here visiting botanists desiring to study the West American and Mexican flora, or to consult the working library of the herbarium, will be welcome, and given every opportunity for research work. Mr. and Mrs. Brandegee will continue their studies at the University, where Mr. Brandegee has been appointed Honorary Curator of the Herbarium.

PROF. OLIVER prints in the *New Phytologist* of October 31st the "recast" of the paper to which we referred in our last issue. He prefaces his paper with a reference to the "restrictions imposed" by us with regard to its publication in this Journal; a reference to p. 404 will show of what nature these were, and we regret that Prof. Oliver, in his own interest, did not impose them on himself, as a case is never strengthened by accusing one's opponent of "irrelevancies and innuendoes" and the like. Prof. Oliver suggests that we were "misled by a too literal interpretation of figures somewhat incautiously employed." We are glad to believe that his words did not bear their obvious construction; but in an address from a presidential chair, when there is no opportunity for discussion or correction, we have a right to expect that even "figures" should be employed with caution. We are glad also to learn that Prof. Oliver's address was really "nothing more revolutionary than a proposal for a working arrangement"; we only regret that he did not make this apparent at the outset, and even now his statement seems to us lacking in clearness; the relationship which should exist between "the schools" and the herbaria is, we think, admirably stated in Prof. Bower's notice of Marshall Ward printed in our present issue. We note, by the way, that Sir George King, in the address referred to by Prof. Oliver, did not speak of the "neglect and decadence" of Systematic Botany, but of "the general decadence of the teaching of Systematic Botany," which is not quite the same thing. The *Gardeners' Chronicle* of Oct. 20 well summarizes the matter in a leading article which we venture to commend to Prof. Oliver's notice.

MR. B. D. JACKSON points out that the statement on p. 399 that there was only one Secretary of the Linnean Society during Bentham's presidency is incorrect; Mr. F. Currey was Botanical Secretary from 1860 to 1880. The fact however remains that Bentham did most of the Society's work so far as botany was concerned.

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ERRATA.

- P. 105, l. 12 from bottom, for "Classemoile" read "Classenwell."
 P. 112, l. 21 from bottom, for "pl." read "p."
 P. 115, l. 6 from top, for "Liberal; Conservative" read "Liberal-Conservative."
 P. 269, l. 9 from bottom, for "1815" read "1813."
 P. 281, delete lines 6-8 from bottom, and see p. 320.
 P. 302, l. 18 from top, for "Willkomm, 1854" read "Wilkinson, 1834."
 P. 329, l. 2 from top, for "27th" read "20th."
 P. 349, ll. 10, 11, transpose "right" and "left."
 P. 370, l. 8 from bottom, for "younger brother" read "nephew."
 P. 399, l. 11 from bottom, see note on p. 436.

INDEX ABECEDARIUS:

AN ALPHABETICAL INDEX TO THE FIRST EDITION OF THE *Species Plantarum* OF LINNÆUS.

COMPILED BY WILLIAM PHILIP HIERN, F.R.S.

THE Binary method of Nomenclature, that is, the designation of species by means of two words, the generic and the trivial names, takes its epoch from the year 1753, the date of publication of the first edition of Linnæus's *Species Plantarum*. This method has proved to be the most convenient hitherto employed in classification, and it is now generally adopted. Notwithstanding some exceptions, whether attempted to be imposed by authority or due to the idiosyncrasies of particular botanists, it is a leading principle that the law of priority in respect of the time of publication is dominant, so that the oldest name, legitimately published according to the Binary method and available for use, should in each case be preferred to all later names. Hence it results that the names given in the work above cited are and must be in frequent use and reference. Since the book is very scarce, a complete index to all the names of species in it, with quotations of the pages where contained, cannot fail to be serviceable to botanists. The book consisted of two volumes, and these appeared in different months of the same year. The preface was dated 2nd May, 1753, and thus the first volume is deemed to have been published during that month; there was no table of contents in this volume. The second volume, which begins after the title with page 561, is credited with the date of August, 1753. Consistently with this belief the academic essay, *Demonstrationes plantarum in horto upsaliensi MDCCLIII*, which was kept by J. C. Höjer at Upsal on 3rd October, 1753, before Linnæus as president, used the new Binary nomenclature, with the following explanatory statement:—"Qua in re, facilitate tanto majori usus sum, quod nomina ex *Speciebus Plantarum* Nob. D. Præsidis jam via compendiaria & sine ambagibus proponi possunt, quæ antea difficulter recensebantur."

In this essay the names of species were taken from both volumes

of the *Species Plantarum*, and there were also included other names of some new species, with descriptions in foot-notes, which do not occur in either of the volumes.

In the *Species Plantarum* the trivial names are printed in italic type and placed in the margin opposite to the character of the species. In connection with the first volume it is important to explain that two leaves, being pp. 89-90 and 259-260 respectively, were subsequently cancelled, and that fresh pages to replace them were printed. It is not quite clear when the substituted leaves were issued, whether at the time of publication of the second volume or earlier, or even in many cases with copies of the first volume; at all events the index of genera, pp. 1209-1224, towards the close of the second volume, applied to the substituted leaves and not to those cancelled. With reference to this matter, a Bibliographical Note in *Journ. Bot.* 1896, pp. 359-362, may be consulted. So far as the present Index is affected, the differences between the cancelled and the substituted leaves are as follows:—

Instead of the species *Minuartia hispanica* on p. 89 of the cancelled leaf, there was *M. dichotoma* on the same page of the substituted leaf, and there were additional species, *M. campestris* on the same page, and *M. montana* on p. 90 of the substituted leaf.

The name of the genus *Guerezia*, on p. 89, was changed to *Queria*, and the species *G. hispanica* on p. 89 and *G. canadensis* on p. 90 of the cancelled leaf became *Q. hispanica* and *Q. canadensis* both on p. 90 of the substituted leaf.

In the case of *Chærophyllum aromaticum* on p. 259, the trivial name of the species was, apparently by oversight, printed *aromaticus* on the same page as on the other substituted leaf. Before the genus *Seseli* there were inserted the genus *Imperatoria* and the species *I. Ostruthium*, on p. 259 of the substituted leaf, and as a consequence the species *Seseli montanum* was brought over to p. 260. The species *Seseli elatius* on p. 260 of the cancel was altogether omitted from the substitute.

In the Index here supplied the names are given as they appeared on the cancelled pages, and in case of difference the names on the substituted leaves are given with the page-numbers in curved brackets.

It may also be desirable to explain the two symbols ∇ and ♀ , as used in the following instances:—

Campanula Speculum ♀ , *Cotyledon umbilicus* ♀ , and *Scandix Pecten* ♀ , where ♀ stands for *Veneris*; *Sisymbrium Nasturtium* ∇ , where ∇ (or ∇^m) stands for *aquaticum*; *Veronica Anagallis* ∇ , and *Alisma Plantago* ∇ , where ∇ stands for *aquatica*.

Acknowledgment should be rendered to the *Index perfectus ad Caroli Linnæi species plantarum, nempe earum primam editionem*, (anno 1753), published by the late Baron von Mueller in Melbourne in 1880, which he liberally distributed among his botanical friends.

In that *Index* the trivial names were not arranged in alphabetical order, but were left under each genus according to the sequence in the book itself; in the present *Index* the arrangement is strictly alphabetical, and corrections are made by the insertion

of certain names accidentally omitted by Mueller, and by the retention of the spelling employed by Linnæus in the work.

The typographical corrections given in the errata are adopted in the text; in the following instances the names are changed—*Tropæolum majus* and *minus* (p. 345) and *Carlina vulgaris* and *corymbosa* (p. 828) of the text, are reversed in the errata, the second *Prenanthes altissima* (p. 798) is altered to *repens*, and *Aira spicata* (p. 63) to *indicum* [sic]. These names are added in this index in square brackets; names omitted in the text, but supplied in the errata, are similarly indicated. *Micropus erectus*, *Filago montana*, *F. arvensis*, and *F. gallicum* [sic] are given in the Addenda (not paged).

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INTERNATIONAL RULES FOR BOTANICAL NOMENCLATURE

ADOPTED BY THE INTERNATIONAL BOTANICAL CONGRESS, VIENNA, 1905.

I. General Considerations and leading Principles.

Article 1. Natural history can make no progress without a regular system of nomenclature, which is recognized and used by the great majority of naturalists in all countries.

Article 2. The prescriptions which govern the exact system of botanical nomenclature are divided into *principles*, *rules*, and *recommendations*. The principles (Articles 1-9, 10-14, and 15-18) are the foundation of the rules and recommendations. The rules (Articles 10-58), destined to put in order the nomenclature which the past has bequeathed to us, and to form the basis for the future, are always retroactive: names or forms of nomenclature which are contrary to a rule cannot be maintained. Recommendations bear on secondary points, their object being to ensure for the future a greater uniformity and clearness in nomenclature: names or forms of nomenclature contrary to a recommendation are not a model to copy, but cannot be rejected.

Article 3. The rules of nomenclature should neither be arbitrary nor imposed by authority. They must be simple and founded on considerations clear and forcible enough for everyone to comprehend, and be disposed to accept.

Article 4. The essential points in nomenclature are—(1) to aim at fixity of names; (2) to avoid or to reject the use of forms and names which may cause error or ambiguity, or throw science into confusion.

Next in importance is the avoidance of all useless creation of names.

Other considerations, such as absolute grammatical correctness, regularity, or euphony of names, more or less prevailing custom, respect for persons, &c., notwithstanding their undeniable importance, are relatively accessory.

Article 5. No custom contrary to rule can be upheld if it leads to confusion or error. When a custom offers no serious inconvenience of this kind it may be a ground for exceptions which we must, however, abstain from extending or copying. Finally, in the

absence of rule, or where the consequences of rules are doubtful, established custom becomes law.

Article 6. The principles and forms of nomenclature should be as similar as possible in botany and in zoology, but botanical nomenclature is entirely independent of zoological nomenclature.

Article 7. Scientific names are in Latin for all groups. When taken from another language a Latin termination is given them, except in cases sanctioned by custom. If translated into a modern language, it is desirable that they should preserve as great a resemblance as possible to the original Latin names.

Article 8. Nomenclature comprises two categories of names :
1. Names, or rather terms, which express the nature of the groups comprehended one within the other. 2. Names peculiar to each of the groups of plants that observation has made known.

Article 9. The rules and recommendations of botanical nomenclature apply to all classes of the plant kingdom, reserving special arrangements for fossil plants and non-vascular plants.*

II. On the Manner of designating the Nature and the Subordination of the Groups which constitute the Plant Kingdom.

Article 10. Every individual plant belongs to a species (*species*), every species to a genus (*genus*), every genus to a family (*familia*), every family to an order (*ordo*), every order to a class (*classis*), every class to a division (*divisio*).

Article 11. In many species we distinguish varieties (*varietas*), and forms (*forma*); and, in some cultivated species, modifications still more numerous; in many genera, sections (*sectio*); in many families, tribes (*tribus*).

Article 12. Finally, if circumstances require us to distinguish a greater number of intermediate groups, it is easy, by putting the syllable *sub* before the name of a group, to form subdivisions of that group. In this way subfamily (*subfamilia*) designates a group between a family and a tribe, subtribe (*subtribus*) a group between a tribe and a genus, &c. The arrangement of subordinate groups may thus be carried, for wild plants only, to twenty-one degrees, in the following order:—Regnum vegetabile; Divisio; Subdivisio; Classis; Subclassis; Ordo; Subordo; Familia; Subfamilia; Tribus; Subtribus; Genus; Subgenus; Sectio; Subsectio; Species; Subspecies; Varietas; Subvarietas; Forma; Individuum.

If this list of groups is insufficient, it can be augmented by the intercalation of supplementary groups, so long as these do not introduce confusion or error.

Example: *Series* and *Subseries* are groups which can be intercalated between subsection and species.

* These special arrangements have been reserved for the Congress of 1910. They comprise—(1) rules bearing on special points in relation to the nature of fossils or the lower plants; (2) lists of *nomina conservanda* for all divisions of plants other than Phanerogams.

Article 13. The definition of each of these names of groups varies, up to a certain point, according to individual opinion and the state of the science, but their relative order, sanctioned by custom, must not be altered. No classification is admissible which contains such alterations.

Examples of inadmissible alterations are: a form divided into varieties, a species containing genera, a genus containing families or tribes.

Article 14. The fertilization of one species by another gives rise to a hybrid (*hybrida*); that of a modification or subdivision of a species by another modification of the same species gives rise to a half-breed (*mistus*, *mule* of florists).

RECOMMENDATIONS.

I. The arrangement of species in a genus, or in a subdivision of a genus, is made by means of typographic signs, letters, or numerals. Hybrids are arranged after one of the parent species, with the sign $\times$ placed before the generic name.

The arrangement of subspecies under a species is made by letters or numerals; that of varieties by the series of Greek letters α , β , γ , &c. Groups below varieties and also half-breeds are indicated by letters, numerals, or typographic signs, at the author's will.

Modifications of cultivated plants should be associated, as far as possible, with the species from which they are derived.

III. On the Manner of designating each Group or Association of Plants.

Section 1. GENERAL PRINCIPLES; PRIORITY.

Article 15. Each natural group of plants* can bear in science only one valid designation, namely, the oldest, provided that it is in conformity with the rules of nomenclature, and the conditions laid down in Articles 19 and 20 of Section 2.

Article 16. The designation of a group by one or several names is not for the purpose of describing the characters or the history of the group, but that we may be understood when we wish to speak of it.

Article 17. No one should change a name or a combination of names without serious motives, based on a more profound knowledge of facts, or on the necessity of giving up a nomenclature that is contrary to rules.

Article 18. The form, number, and arrangement of names depend on the nature of each group, according to the following rules.

Section 2. POINT OF DEPARTURE FOR NOMENCLATURE; LIMITATION OF PRINCIPLE OF PRIORITY.

Article 19. Botanical nomenclature begins with the *Species Plantarum* of Linnæus, ed. 1 (1753), for all groups of vascular

* See observation to Article 9.

plants. It is agreed to associate genera, the names of which appear in this work, with the descriptions given of them in the *Genera Plantarum*, ed. 5 (1754).

Article 20. However, to avoid disadvantageous changes in the nomenclature of genera by the strict application of the rules of nomenclature—and especially of the principle of priority in starting from 1753—the rules provide a list of names which must be retained in all cases. These names are by preference those which have come into general use in the fifty years following their publication, or which have been used in monographs and important floristic (*floristiques*) works up to the year 1890. The list of these names forms an appendix to the rules of nomenclature.

Section 3. NOMENCLATURE OF THE DIFFERENT KINDS OF GROUPS.

§ 1. Names of Groups above the Family.

RECOMMENDATIONS. The following suggestions as to the nomenclature of groups of higher rank than the family will tend to clearness and uniformity.

II. Names of divisions and subdivisions, of classes and subclasses, are taken from one of their chief characters. They are expressed by words of Greek or Latin origin, some similarity of form and termination being given to those that designate groups of the same nature.

Examples: *Angiospermæ*, *Gymnospermæ*, *Monocotyledoneæ*, *Dicotyledoneæ*, *Pteridophyta*, *Coniferæ*. Among Cryptogams, old family names such as *Fungi*, *Lichenes*, *Algæ* may be used for names of groups above the rank of family.

III. Orders are designated preferably by the name of one of their principal families, with the ending *-ales*. Suborders are designated in a similar manner, with the ending *-ineæ*. But other terminations may be retained for these names, provided that they do not lead to confusion or error.

Examples of names of orders: *Polygonales* (from *Polygonaceæ*), *Urticales* (from *Urticaceæ*), *Glumifloræ*, *Centrospermæ*, *Parietales*, *Tubifloræ*, *Microspermæ*, *Contortæ*. Examples of names of suborders: *Bromeliineæ* (from *Bromeliaceæ*), *Malvineæ* (from *Malvaceæ*), *Tricoccæ*, *Euantioblastæ*.

§ 2. Names of Families and Subfamilies, Tribes and Subtribes.

Article 21. Families (*familiæ*) are designated by the name of one of their genera or ancient generic names, with the ending *-aceæ*.

Examples: *Rosaceæ* (from *Rosa*), *Salicaceæ* (from *Salix*), *Caryophyllaceæ* (from *Dianthus Caryophyllus*), &c.

Article 22. The following names, owing to long usage, are an exception to the rule: *Palmæ*, *Gramineæ*, *Cruciferæ*, *Leguminosæ*, *Guttiferæ*, *Umbelliferæ*, *Labiataæ*, *Compositæ*.

Article 23. Names of subfamilies (*subfamiliæ*) are taken from the name of one of the genera in the group, with the ending *-oideæ*.

The same holds for the tribes (*tribus*) with the ending *-eæ*, and for the subtribes (*subtribus*) with the ending *-inæ*.

Examples of subfamilies: *Asphodeloideæ* (from *Asphodelus*), *Rumicoideæ* (from *Rumex*). Tribes: *Asclepiadeæ* (from *Asclepias*), *Phyllanthææ* (from *Phyllanthus*). Subtribes: *Metastelmatinæ* (from *Metastelma*), *Madiinæ* (from *Madia*).

§ 3. Names of Genera and Divisions of Genera.

Article 24. Genera receive names, substantives (or adjectives used as substantives) in the singular number, and written with a capital letter, which may be compared with our own family names. These names may be taken from any source whatever, and may even be composed in an absolutely arbitrary manner.

Examples: *Rosa*, *Convolvulus*, *Hedysarum*, *Bartramia*, *Liquidambar*, *Gloriosa*, *Impatiens*, *Manihot*.

Article 25. Subgenera and sections also receive names, usually substantives, and resembling the names of genera. Names of subsections and other lower subdivisions of genera are preferably adjectives in the plural number, and written with a capital letter, or their place may be taken by an ordinal number or a letter.

Examples. Substantives: *Fraxinaster*, *Trifolium*, *Adenoscilla*, *Euhermannia*, *Archieracium*, *Micromelilotus*, *Pseudinga*, *Heterodraba*, *Gymnocimum*, *Neoplatago*, *Stachyotypus*. Adjectives: *Pleiostylæ*, *Fimbriati*, *Bibracteolata*, *Pachycladæ*.

RECOMMENDATIONS.

IV. When the name of a genus, subgenus, or section is taken from the name of a person, it is formed in the following manner:

(a) When the name ends in a vowel, the letter *a* is added (for example, *Glaziousa* after Glazion, *Bureaua* after Bureau), except when the name already ends in *a*, in which case *ea* is added (e. g. *Collæa* after Colla).

(b) When the name ends in a consonant, the letters *ia* are added (thus, *Magnusia* after Magnus, *Ramondia* after Ramond), except when the name ends in *er*, in which case *a* is added (e. g. *Kerneria* after Kerner).

(c) The spelling of the syllables unaffected by these finals is retained, even with the consonants *k* and *w*, or with groupings of vowels which were not used in classic Latin. Letters which are unknown to botanical Latin must be transcribed, diacritic signs are suppressed. The German *ä*, *ö*, *ü* become *ae*, *oe*, *ue*; the French *é*, *è*, and *ê* become generally *e*.

(d) Names may be accompanied by a prefix, or a suffix, or modified by anagram or abbreviation. In these cases they count as different words from the original name—e. g. *Durvillea* and *Urvillea*, *Lapeyrousea* and *Peyrousea*, *Englera*, *Englerastrum*, and *Englerella*, *Bouchea* and *Ubochea*, *Gerardia* and *Graderia*, *Martia* and *Martusia*.

V. Botanists who are publishing generic names show judgment and taste by attending to the following recommendations:—

(a) Not to make names very long or difficult to pronounce.

(b) Not to use again a name which has already been used, and has lapsed into synonymy (homonym).

(c) Not to dedicate genera to persons who are in all respects strangers to botany, or at least to natural science, nor to persons quite unknown.

(d) Not to take names from barbarous tongues, unless those names are frequently quoted in books of travel, and have an agreeable form that is readily adapted to the Latin tongue, and to the tongues of civilized countries.

(e) To recall, if possible, by the formation or ending of the name, the affinities or the analogies of the genus.

(f) To avoid adjectives used as nouns.

(g) Not to give a genus a name whose form is rather that of a subgenus or section (e. g. *Eusideroxylon*, a name given to a genus of *Lauraceæ*, which, however, being valid, cannot be changed).

(h) Not to make names by the combination of two languages (*nomina hybrida*).

VI. Botanists constructing names for subgenera or sections will do well to attend to the preceding recommendations, and also to the following:—

(a) Give, where possible, to the principal division of a genus, a name which, by some modification or addition, calls the genus to mind (for instance, *Eu* placed at the beginning of the name, when it is of Greek origin; *-astrum*, *-ella* at the end of the name, when Latin, or any other modification consistent with the grammar and usages of the Latin language).

(b) Avoid calling a subgenus or a section by the name of the genus to which it belongs, with the final *-oides* or *-opsis*; on the contrary, reserve this ending for a section which resembles another genus, by adding in that case *-oides* or *-opsis* to the name of that other genus, if it is of Greek origin, to form the name of the section.

(c) Avoid taking as the name of a subgenus or section a name which is already in use as such in another genus, or which is the name of an admitted genus.

VII. When it is required to express a subgeneric or sectional name, together with the name of the genus and the name of the species, the name of the section is put between the others in a parenthesis—e. g. *Astragalus (Cycloglottis) contortuplicatus*.

§ 4. Names of Species and of Subdivisions of Species.

Article 26. All species, even those that singly constitute a genus, are designated by the name of the genus to which they belong, followed by a name (or epithet) termed specific, usually of the nature of an adjective (forming a combination of two names, a binomial or binary name).

Examples: *Dianthus monspessulanus*, *Papaver Rhæas*, *Fumaria Gussonei*, *Uromyces Fabæ*, *Geranium Robertianum*, *Embelia Sarasinorum*, *Adiantum Capillus-Veneris*. Linnæus has sometimes introduced symbols in specific names. These must, according to

Article 26, be transcribed. Examples : *Scandix Pecten-Veneris* (= *Scandix Pecten* ♀) ; *Veronica Anagallis-aquatica* (= *Veronica Anagallis* ▽).

RECOMMENDATIONS.

VIII. The specific name should, in general, give some indication of the appearance, the characters, the origin, the history, or the properties of the species. If taken from the name of a person, it usually recalls the name of the one who discovered or described it, or was in some way concerned with it.

IX. Names of men and women, and also names of countries and localities used as specific names, may be substantives in the genitive (*Clusii*, *saharæ*), or adjectives (*Clusianus*, *dahuricus*). It will be well, in the future, to avoid the use of the genitive and the adjectival form of the same name to designate two different species of the same genus [for example, *Lysimachia Hemsleyana* Maxim. (1891) and *L. Hemsleyi* Franch. (1895)].

X. Specific names begin with a small letter, except those which are taken from names of persons (substantives or adjectives), or those which are old generic names (substantives or adjectives).

Examples: *Ficus indica*, *Circæa lutetiana*, *Brassica Napus*, *Lythrum Hyssopifolia*, *Aster novibelgii*, *Malva Tournefortiana*, *Phyteuma Halleri*.

XI. When a specific name is taken from the name of a man, it is formed in the following way:—

(a) When the name ends in a vowel, the letter *i* is added (thus *Glazioui* from Glaziou, *Bureaui* from Bureau), except when the name ends in *a*, when *e* is added (thus, *Balansæ* from Balansa).

(b) When the name ends in a consonant, the letters *ii* are added (thus, *Magnusii* from Magnus, *Ramondii* from Ramond), except when the word ends in *er*, when *i* added (example, *Kernerii* from Kerner).

(c) Syllables which are not modified by these endings retain their original spelling, even in the case of the consonants *k* and *w*, or groupings of vowels which are not used in classic Latin. Letters foreign to the Latin of botanists should be transcribed, and diacritic signs suppressed. The German *ä*, *ö*, *ü* become *ae*, *oe*, *ue*; the French *é*, *è*, *ê* become, in general, *e*.

(d) When specific names taken from the name of a person have an adjectival form a similar plan is adopted (*Geranium Robertianum*, *Carex Hallerana*, *Ranunculus Boreauanus*, &c.).

XII. The same applies to the names of women. These are written in the feminine when they have a substantival form.

Example: *Cypripedium Hookeræ*, *Rosa Beatricis*, *Scabiosa Olgæ*, *Omphalodes Luciliæ*.

XIII. In the formation of specific names composed of two or several roots, and taken from Latin or Greek, the vowel placed between the two roots becomes a connecting vowel—in Latin *i*, in Greek *o*; thus we write *menthifolia*, *salviifolia*, not *menthæfolia*, *salviæfolia*. When the second root begins with a vowel and euphony

demands, the connecting vowel is eliminated (e. g. *calliantha*, *lepidantha*). The connecting *æ* is legitimate only when etymology demands (e. g. *caricæformis*, from *Carica*, may be retained along with *cariciformis*, from *Carex*).

XIV. In forming specific names, botanists will do well to note the following recommendations:—

(a) Avoid very long names, and those which are difficult to pronounce.

(b) Avoid names which express a character common to all, or nearly all, the species of a genus.

(c) Avoid names taken from little known or very restricted localities, unless the species be very local.

(d) Avoid, in the same genus, names which are very much alike, especially those which differ only in their last letters.

(e) Adopt unpublished names found in travellers' notes and herbaria, attributing them to the authors concerned only when those concerned have approved the publication.

(f) Avoid names which have been used before in the genus, or in any closely allied genus, and which have lapsed into synonymy (homonyms).

(g) Do not name a species after a person who has neither discovered, nor described, nor figured, nor in any way studied it.

(h) Avoid specific names formed of two words.

(i) Avoid names which have the same meaning as the generic name.

Article 27. Two species of the same genus cannot bear the same specific name, but the same specific name may be given in several genera.

Example: *Arabis spathulata* DC. and *Lepidium spathulatum* Phil. are valid as two names of Crucifers; but *Arabis spathulata* Nutt. in Torr. and Gray cannot be maintained, on account of the existence of *Arabis spathulata* DC., a name previously given to another valid species of *Arabis*.

Article 28. Names of subspecies and varieties are formed like specific names, and follow them in order, beginning with those of the highest rank. The same holds for subvarieties, forms, and slight or transient modifications of wild plants which receive a name, or numbers or letters to facilitate their arrangement. Use of a binary nomenclature for subdivisions of species is not admissible.

Examples: *Andropogon ternatus* subsp. *macrothrix* (not *Andropogon macrothrix* or *Andropogon ternatus* subsp. *A. macrothrix*); *Herniaria hirsuta* var. *diandra* (not *Herniaria diandra* or *Herniaria hirsuta* var. *H. diandra*); forma *nanus*, forma *maculatum*.

RECOMMENDATION.

XV. Recommendations made for the specific names apply equally to names of subdivisions of species. These agree with the generic name when they have an adjectival form (*Thymus Serpyllum* var. *angustifolius*, *Ranunculus acris* subsp. *Friesianus*).

Article 29. Two subspecies of the same species cannot have the same name. A given name can only be used once for a variety of a given species, even when dealing with varieties which are classed under different subspecies. The same holds for subvarieties and forms.

On the other hand, the same name may be employed for subdivisions of different species, and the subdivisions of any one species may bear the same name as other species.

Examples. The following are admissible: *Rosa Jundzillii* var. *leioclada* and *Rosa glutinosa* var. *leioclada*; *Viola tricolor* var. *hirta*, in spite of the existence already of a different species named *Viola hirta*. The following are incorrect: *Erysimum hieraciifolium* subsp. *strictum* var. *longisiliquum*, and *E. hieraciifolium* subsp. *pannonicum* var. *longisiliquum*—a form of nomenclature which allows two varieties bearing the same name in the same species.

RECOMMENDATION.

XVI. Botanists are recommended to use as little as possible the privilege granted in the second part of Article 29, in order to avoid confusion and mistakes, and also to reduce to a minimum the necessary changes of name when the subdivisions of species are raised to specific rank, or *vice versâ*.

Article 30. Forms and half-breeds among cultivated plants should receive fancy names, in common language, as different as possible from the Latin names of the species or varieties. When they can be traced back to a species, a subspecies, or a botanical variety, this is indicated by a succession of names.

Example: *Pelargonium zonale* Mrs. Pollock.

§ 5. Names of Hybrids and Half-breeds (Mules).

Article 31. Hybrids between species of the same genus, or presumably so, are designated by a formula, and, whenever it seems useful or necessary, by a name.

The formula consists of the names or specific epithets of the two parents in alphabetical order, and connected by the sign $\times$. When the hybrid is of known experimental origin the formula may be made more precise by the addition of the signs σ , ρ .

The name, which is subject to the same rules as names of species, is distinguished from the latter by absence of an ordinal number, and by the sign $\times$ before the name.

Examples: $\times$ *Salix capreola* = *Salix aurita* $\times$ *caprea*; *Digitalis lutea* ρ $\times$ *purpurea* σ ; *Digitalis lutea* σ $\times$ *purpurea* ρ .

Article 32. Intergeneric hybrids (between species of different genera), or presumably such, are also designated by a formula, and, when it seems useful or necessary, by a name.

The formula consists of the names of the two parents, in alphabetical order.

The hybrid is associated with the one of the two genera which precedes the other in alphabetical order. The name is preceded by the sign $\times$.

Examples: $\times$ *Ammophila baltica* = *Ammophila arenaria* $\times$ *Calamagrostis epigeios*.

Article 33. Ternary hybrids, or those of a higher order, are designated like ordinary hybrids by a formula and a name.

Examples: $\times$ *Salix Straehleri* = *S. aurita* $\times$ *cinerea* $\times$ *repens*, or *S. (aurita* $\times$ *repens)* $\times$ *cinerea*.

Article 34. When there is reason to distinguish the different forms of a hybrid (pleomorphic hybrids, combinations between different forms of collective species, &c.), the subdivisions are classed under the hybrid like the subdivisions of species under a species.

Examples: $\times$ *Mentha villosa* β *Lamarckii* (= *M. longifolia* $\times$ *rotundifolia*). The preponderance of the characters of one or other parent may be indicated in the formulas in the following manner: *Mentha longifolia* $>$ $\times$ *rotundifolia*, *M. longifolia* $\times$ $<$ *rotundifolia*, *Cirsium supercanum* $\times$ *rivulare*, &c., &c. The participation of a particular variety may also be indicated. Example: *Salix caprea* $\times$ *daphnoides* var. *pulchra*.

RECOMMENDATION.

XVII. Half-breeds, or presumably such, may be designated by a name and a formula. Names of half-breeds are intercalated among the subdivisions of a species preceded by the sign $\times$. In the formula the names of the parents are in alphabetical order.

Section 4. THE PUBLICATION OF NAMES AND THE DATE OF EACH NAME OR COMBINATION OF NAMES.

Article 35. Publication is effected by the sale or public distribution of printed matter or indelible autographs.

Communication of new names at a public meeting, or the placing of names in collections or gardens open to the public, do not constitute publication.

Examples. Effective publication without printed matter: *Salvia oxyodon* Webb and Heldr. was published in July, 1850, in an autograph catalogue, and put on sale (Webb and Heldreich, *Catalogus plantarum hispanicarum, etc., ab A. Blanco lectarum, Parisiis, Jul. 1850, in folio*). Non-effective publication at a public meeting: Cusson announced his establishment of the genus *Physospermum* in a memoir read at the Société des Sciences de Montpellier in 1773, and later in 1782 or 1783 at the Société de Médecine de Paris; but its effective publication dates from 1787, in the *Mémoires de la Soc. Roy. de Médecine de Paris*, vol. v. 1^{re} partie.

Article 36. On and after January 1st, 1908, the publication of names of new groups will be valid only when they are accompanied by a Latin diagnosis.

Article 37. A species or a subdivision of a species, announced in a work, with a complete specific or varietal name, but without diagnosis or reference to a former description under another name, is not valid. Citation in synonymy or incidental mention of a name is not effective publication, and the same applies to the mention of

name on a ticket issued with a dried plant without printed or autographed diagnosis.

Plates accompanied with analyses are equivalent to a description; but this applies only to plates published before January 1st, 1908.

Examples. The following are valid publications: *Onobrychis eubrychidea* Boiss. *F. Or.* ii. 546 (1872), published with description; *Panax nossibiensis* Drake in Grandidier *Hist. Phys. Nat. et Polit. de Madagascar*, vol. xxxv. t. v. iii. 5^e part. pl. 406 (1896), published in the form of a plate with analyses; *Cynanchum nivale* Nym. *Syll. fl. Eur.* 108 (1854-1855), published with a reference to *Vincetoxicum nivale* Boiss. et Heldr., previously described. *Hieracium Flahaultianum* Arv.-Touv. et Gaut., published in an exsiccata accompanied by a printed diagnosis (*Hieraciotheca gallica*, nos. 935-942, 1903). The following are not valid: *Sciadophyllum heterotrichum* Decaisne et Planch. in *Rev. Hort.* ser. iv. iii. 107 (1854), published without description or reference to a previous description under another name; *Ornithogalum undulatum* Hort. Berol. ex Kunth, *Enum. Pl.* iv. 348 (1843), quoted as a synonym of *Myogalum Boucheanum* Kunth, *l. c.*, the name adopted by the author, is not a valid publication; when transferred to *Ornithogalum*, this species must be called *Ornithogalum Boucheanum* Aschers. in *Osterr. Bot. Zeitschr.* xvi. 192 (1866); *Erythrina micropteryx* Poepp., quoted as a synonym of *Micropteryx Poeppigiana* Walp. in *Linnæa*, xxiii. 740 (1850), is not a valid publication; the species in question, when placed in the genus *Erythrina*, must be called *Erythrina Poeppigiana* O. F. Cook in *U.S. Dep. Agr. Bull.* no. 25, p. 57 (1901); *Nepeta Sieheana* Hausskn., which appears without diagnosis in an exsiccata (W. Siehe, *Bot. Reise nach Sicilien*, no. 521, 1896), is not valid.

Article 38. A genus or any other group of higher rank than a species, named or announced without being characterized conformably to Article 37, cannot be regarded as effectively published (*nomen nudum*). The mere indication of species as belonging to a new genus, or of genera as belonging to a higher group, does not allow us to accept the genus or group in question as characterized and effectively published. An exception is made in the case of the generic names mentioned by Linnæus in the *Species Plantarum*, ed. 1, 1753, names which we associate with the descriptions in the *Genera Plantarum*, ed. 5, 1754 (see Article 19).

Examples. The following are valid publications: *Carphalea* Juss. *Gen. Pl.* 198 (1789), published with a description; *Thuspeinanta* Dur. *Ind. Gen. Phaner.* p. x (1888), published with a reference to the genus *Tapeinanthus* Boiss., previously described; *Stipa* L. *Sp. Pl.* ed. 1, 78 (1753), valid because accompanied by a description in the *Genera Plantarum*, ed. 5, no. 84 (1754). The following are not valid: *Egeria* Neraud (*Bot. Voy. Freycinet*, p. 28 (1826)) published without diagnosis or reference to a description previously made under another name; *Acosmus* Desv., mentioned incidentally as a synonym of the genus *Aspicarpa* Rich. by De Candolle (*Prodr.* i. 583 [1824]); *Zatarhendi* Forsk. *Fl. Æg. Arab.* p. cxv (1775),

based only on the enumeration of three species of the genus *Ocimum* without indication of characters.

Article 39. The date of a name, or of a combination of names, is that of their effective publication. In the absence of proof to the contrary, the date placed on the work containing the name or combination of names is regarded as correct. On and after January 1st, 1908, the date of publication of the Latin diagnosis only can be taken into account in questions of priority.

Examples. *Mentha foliicoma* Opiz was distributed by its author in 1832, but the name dates from 1882 (published by Déséglise, *Menth. Op.* in *Bull. Soc. Etud. Scient. Angers*, 1881-1882, p. 210); *Mentha bracteolata* Op. Seznam, p. 65 (1852), without description, takes effect only from 1882, when it was published with a description (Déséglise, *l. c.*, p. 211). There is some reason for supposing that the first volume of Adanson's *Familles des Plantes* was published in 1762, but in absence of certainty the date 1763 on the title-page is assumed to be correct. The different parts of Willdenow's *Species Plantarum* were published as follows:—Vol. i. 1798; vol. ii. 2, 1800; vol. iii. 1, 1801; vol. iii. 2, 1803; vol. iii. 3, 1804; vol. iv. 2, 1806; and not in the years 1797, 1799, 1800, 1800, 1800, and 1805, respectively, as would appear from the title-page of the volumes: it is the earlier series of dates which takes effect. The third volume of the *Prodromus Floræ Hispanicæ* of Willkomm & Lange, the title-page of which bears the date 1880, was published in four parts—pp. 1-240 in 1874, pp. 241-512 in 1877, pp. 513-736 in 1878, p. 737 to the end in 1880, and it is these dates which take effect.

RECOMMENDATIONS. Botanists will do well, in publishing, to conform to the following recommendations.

XVIII. Not to publish a name without clearly indicating whether it is the name of a family or a tribe, a genus or a section, a species or a variety, briefly, without expressing an opinion on the nature of the group to which they give the name.

XIX. To avoid publishing or mentioning in their publications unpublished names which they do not accept, especially if the persons responsible for these names have not formally authorized their publication. (See Recommendation XIV, *e.*)

XX. When publishing new names in works written in a modern language (floras, catalogues, &c.), to publish simultaneously the Latin diagnoses which will make the names valid from the point of view of scientific nomenclature.

XXI. To give the etymology of new generic names, and also of specific names when the meaning of the latter is not obvious.

XXII. To indicate precisely the date of publication of their works, and that of the placing on sale or the distribution of named and numbered plants when these are accompanied by printed diagnoses. In the case of a work appearing in parts, the last published sheet of a volume should indicate the precise dates at

which the different fascicles or parts of the volume were published, as well as the number of pages in each.

XXIII. When works are published in periodicals, to require the editor to indicate on the separate copies the date (year and month) of publication, and also the title of the periodical from which the work is extracted.

XXIV. Separate copies should always bear the pagination of the periodical of which they form a part; if desired, they may also bear a special pagination.

Section 5. ON THE PRECISION TO BE GIVEN TO NAMES BY THE CITATION OF THE AUTHOR WHO FIRST PUBLISHED THEM.

Article 40. For the indication of the name or names of a group to be accurate and complete, and in order that the date may be readily verified, it is necessary to quote the author who first published the name or combination of names in question.

Examples: *Simarubaceæ* Lindley, *Simaruba* Aublet, *Simaruba lævis* Grisebach, *Simaruba amara* Aublet var. *opaca* Engler.

Article 41. An alteration of the constituent characters or of the circumscription of a group does not warrant the quotation of another author than the one who first published the name or combination of names.

When the changes have been considerable, the words *mutatis charact.*, or *pro parte*, or *excl. gen.*, *excl. sp.*, *excl. var.*, or some other abridged indication, are added after the citation of the original author, according to the nature of the changes that have been made, and of the group in question.

Examples: *Phyllanthus* L. em.(endavit), Müll. Arg.; *Myosotis* L. pro parte, R. Br.; *Globularia cordifolia* L. excl. var. β .; &c.

Article 42. When a manuscript name has been published and referred to its author, the name of the person who published it should be appended to the citation. The same rule should be followed for names of garden origin when they are cited as "Hort."

Examples: *Capparis lasiantha* R. Br. ex or apud DC.; *Streptanthus heterophyllus* Nutt. in Torr. et Gray; *Gesnera Donklarii* Hort. ex or apud Hook. Bot. Mag. tab. 5070.

Article 43. When, in a genus, a name is applied to a group which is moved into another group where it retains the same rank, or to a group which becomes of higher or lower rank than before, the change is equivalent to the creation of a new group, and the author who has effected the change is the one to be quoted. The original author can be cited only in parenthesis.

Examples. *Cheiranthus tristis* L., when moved into the genus *Matthiola*, becomes *Matthiola tristis* R. Br., or *Matthiola tristis* (L.) R. Br. *Medicago polymorpha* L. var. *orbicularis* L. when raised to the rank of a species becomes *Medicago orbicularis* All., or *Medicago orbicularis* (L.) All.

RECOMMENDATIONS.

XXV. Authors' names put after names of plants are abbreviated, unless they are very short.

For this purpose preliminary particles, or letters, that do not, strictly speaking, form part of the name, are suppressed, and the first letters are given without any omission. If a name of one syllable is long enough to make it worth while to abridge it, the first consonants only are given (Br. for Brown); if the name has two or more syllables, the first syllable and the first letter of the following one are taken, or the two first when both are consonants (Juss. for Jussieu; Rich. for Richard). When it is necessary to give more of a name to avoid confusion between names beginning with the same syllables, the same system is to be followed. For instance, two syllables are given together with the one or two first consonants of the third; or one of the last characteristic consonants of the name is added (Bertol. for Bertoloni, to distinguish from Bertero; Michx. for Michaux, to distinguish from Micheli). Christian names, or accessory designations, serving to distinguish two botanists of the same name, are abridged in the same way (Adr. Juss. for Adrien de Jussieu, Gaertn. fil., or Gaertn. f., for Gaertner filius).

When it is a well-established custom to abridge a name in another manner, it is best to conform to it (L. for Linnæus, DC. for De Candolle, St.-Hil. for Saint-Hilaire).

In publications destined for the general public and in titles it is preferable not to abridge.

Section 6. ON NAMES THAT ARE TO BE RETAINED WHEN A GROUP IS DIVIDED, REMODELLED, TRANSFERRED, OR MOVED FROM ONE RANK TO ANOTHER, OR WHEN TWO GROUPS OF THE SAME RANK ARE UNITED.

Article 44. A change of characters, or a revision which involves the exclusion of certain elements of a group or the addition of new elements, does not warrant a change in the name or names of a group, except in cases provided for in Article 51.

Examples. The genus *Myosotis* as revised by R. Brown differs from the original genus of Linnæus, but the name has not been changed, nor is any change allowable. Various authors have united with *Centaurea Jacea* L. one or two species which Linnæus had kept distinct; the group thus constituted must be called *Centaurea Jacea* L. (sensu ampl.), or *Centaurea Jacea* L. (em. Visiani, em. Godron, &c.); the creation of a new name, such as *Centaurea vulgaris* Godr., is superfluous.

Article 45. When a genus is divided into two or more genera, the name must be kept and given to one of the principal divisions. If the genus contains a section or some other division, which, judging by its name or its species, is the type or the origin of the group, the name is reserved for that part of it. If there is no such section or subdivision, but one of the parts detached contains a

great many more species than the others, the name is reserved for that part of it.

Examples. The genus *Helianthemum* contained, according to Dunal (in DC. *Prodr.* i. 266–284 [1824]), 112 well-known species distributed in nine sections; several of these sections have since been raised to generic rank (*Fumana* Spach, *Tuberaria* Spach), but the name *Helianthemum* has been kept for the divisions grouped round the section *Euhelianthemum*. The genus *Convolvulus* L. em. Jacq. was divided into two by Robert Brown in 1810 (*Prodr. fl. Nov. Holl.*, pp. 482–484), who gave the name *Calystegia* to one of the genera which at that time contained only four species, and reserved the name *Convolvulus* for the other genus which contained a much larger number of species. In the same way, Salisbury (in *Trans. Linn. Soc.* vi. 317 [1802]), in separating *Erica vulgaris* L. from the genus *Erica*, under the name *Calluna*, kept the name *Erica* for the large number of species left.

Article 46. When two or more groups of the same nature are united, the name of the oldest is retained. If the names are of the same date, the author chooses, and his choice cannot be modified by subsequent authors.

Examples. Hooker f. and Thomson (*Fl. Ind.*, p. 67 [1855]) united the genera *Wormia* Rottb. and *Capellia* Bl.; they gave the name *Wormia* to the genus thus formed because the last name dates from 1783, while *Capellia* dates from 1825. In case of union of the two genera *Cardamine* and *Dentaria*, which were founded at the same time by Linnæus (*Sp. Pl.* ed. 1, pp. 653 and 654 [1753]; *Gen. Pl.* ed. 5, n. 726, 727), the collective genus must be called *Cardamine*, because that name was chosen by Crantz (*Class. Crucif.*, p. 126 [1769]), who was the first to suggest the union.

RECOMMENDATIONS.

XXVI. Authors who have to choose between two generic names should note the following recommendations:—

1. Of two names of the same date, to prefer the one which was first accompanied by the description of a species.

2. Of two names of the same date, both accompanied by descriptions of species, to prefer the one which, when the author made his choice, included the larger number of species.

3. In cases of equality from these various points of view, to prefer the more correct and appropriate name.

XXVII. When several genera are united as subgenera or sections under one generic name, that subdivision which was first distinguished or described may retain its name (example: *Anarrhinum* sect. *Anarrhinum*; *Hemigenia* sect. *Hemigenia*), or be preceded by a prefix (*Anthriscus* sect. *Eu-Anthriscus*), or followed by a suffix (*Stachys* sect. *Stachyotypus*). These prefixes or suffixes lapse when the subdivisions are raised to generic rank.

XXVIII. When several species are united as subspecies or varieties under a collective name, that subdivision that was first distinguished or described may retain its name (example: *Saxifraga*

aspera subsp. *aspera*), or bear a prefix (*Alchemilla alpina* subsp. *eualpina*), or be designated by some customary title (*normalis*, *genuinus*, *typicus*, *originarius*, *verus*, *veridicus*, &c.). These prefixes or terms lapse when the subdivisions are raised in specific rank.

Article 47. When a species or subdivision of a species is divided into two or more groups of the same nature, if one of the two forms was distinguished or described earlier than the other, the name is retained for that form.

Examples. *Genista horrida* DC. *Fl. Franc.* iv. 500, was divided by Spach (in *Ann. Sci. Nat.* ser. 3, ii. 253 [1844]) into three species—*G. horrida* DC., *G. Boissieri* Spach, and *G. Webbii* Spach; the name *G. horrida* was rightly kept for the earliest described form, that described and figured by Vahl and Gilibert. Several species (*Primula cashmiriana* Munro, *P. erosa* Wall.) have been separated from *Primula denticulata* Sm. (*Exot. Bot.* ii. 109, tab. 114), but the name *P. denticulata* has been rightly kept for the form which Smith described and figured under this name.

Article 48. When a subgenus or section or species is moved into another genus, when a variety or other division of a species is moved into another species, retaining there the same rank, the original name of the subgenus or section, the first specific epithet, or the original name of the division of the species must be retained or must be re-established, unless in the new position there exists one of the obstacles indicated in the Articles of Section 7.

Examples. The subgenus *Alfredia* Less. (*Syn.*, p. 6, 1832) of the genus *Rhaponticum* keeps its name when placed in the genus *Carduus*—*Carduus* sect. *Alfredia* Benth. et Hook. fil.; the section *Vaccaria* DC. of the genus *Saponaria* keeps its name when placed in the genus *Gypsophila*—*Gypsophila* sect. *Vaccaria* Gren. et Godr. *Lotus siliquosus* L. *Syst.* ed. 10, p. 1178 (1759), when transferred to the genus *Tetragonolobus* must be called *Tetragonolobus siliquosus* Roth, *Tent. Fl. Germ.* i. 323 (1788), and not *Tetragonolobus Scandali* Scop. *Fl. Carn.*, ed. 2, ii. 87 (1772). *Betula incana* L. *Suppl.*, p. 417 (1781), when transferred to the genus *Alnus* must be called *Alnus incana* Willd. *Sp. Pl.* iv. 335 (1805), not *Alnus lanuginosa* Gilib. *Exerc. Phytol.* ii. 402 (1792). *Satyrium nigrum* L. *Sp. Pl.* ed. 1, 944 (1753), when placed in the genus *Nigritella* must be called *Nigritella nigra* Reichb. f. *Ic. Fl. Germ. et Helv.* xiv. 102 (1851), not *Nigritella angustifolia* Rich. in *Mém. Mus. Par.* iv. 56 (1818). The variety γ *micranthum* Gren. et Godr. (*Fl. France*, i. 171 [1847]) of *Helianthemum italicum* Pers., when transferred as a variety to *H. penicillatum* Thib., retains its name—*H. penicillatum* var. *a micranthum* Grosser (in *Engl. Pflanzenreich*, Heft 14, p. 115 [1903]). The variety *subcarnosa* Hook. fil. (*Bot. Antarct. Voy.* i. 5 [1847]) of *Cardamine hirsuta* L., when transferred as a variety to *C. glacialis* DC., retains its name—*C. glacialis* var. *subcarnosa* O. E. Schulz (in *Engl. Bot. Jahrb.* xxxii. 542 [1903]); the citation of an earlier synonym (*Cardamine propinqua* Carmichael in *Trans. Linn. Soc.* xii. 507 [1818]) has no influence on the choice of the name of the variety (see Article 49). In all these cases, older but incorrect

combinations must give place to more recent combinations in which the rule has been observed.

Article 49. When a tribe becomes a family, a subgenus or a section becomes a genus, a subdivision of a species becomes a species, or the reverse of these changes takes place, and, speaking generally, when a group changes its rank, the earliest name (or combination of names) received by the group in its new position must be regarded as valid, if it is in conformity with the rules, unless there exist any of the obstacles indicated in the Articles of Section 7.

Examples. The section *Campanopsis* R. Br. *Prodr. Fl. Nov. Holl.*, p. 561 (1810) of the genus *Campanula*, was first raised to generic rank by Schrader, and must be called *Wahlenbergia* Schrad. *Cat. hort. Goett.* (1814), not *Campanopsis* O. Kuntze, *Rev. Gen.* ii. p. 378 (1891).—*Magnolia virginiana* L. var. *fœtida* L. *Sp. ed.* 1, p. 536 (1753), raised to specific rank, must be called *Magnolia grandiflora* L. *Syst. Nat.* ed. 10, p. 1082 (1759), not *Magnolia fœtida* Sarg. in *Gard. and For.* ii. 615 (1889).—*Mentha spicata* L. var. *viridis* L. *Sp. Pl.*, ed. 1, p. 576 (1753) was raised to the rank of a species by Hudson, and must be called *Mentha spicata* Huds. *Fl. angl.* ed. 1, p. 221 (1762) not *Mentha viridis* L. *Sp. Pl.*, ed. 2, p. 804 (1763).—*Lythrum intermedium* Ledeb. (*Ind. Hort. Dorp.* [1822]), regarded as a variety of *L. Salicaria* L., must be called *L. Salicaria* var. *gracilius* Turcz. (in *Bull. Soc. Nat. Moscou*, xvii. 235 [1844]), not *L. Salicaria* var. *intermedium* Koehne (in *Engl. Bot. Jahrb.* i. 327 [1881]). In all these cases names which are in accordance with the old law of Alphonse de Candolle must give place to older names and combinations.

RECOMMENDATIONS. Authors who make the changes discussed in Article 49 should note the following recommendations in order to avoid a change of name in case of a change of rank:—

XXIX. 1. When a subtribe becomes a tribe, when a tribe becomes a subfamily, when a subfamily becomes a family, &c., or when the inverse changes occur, do not alter the root of a name but only the termination (*-inæ*, *-eæ*, *-oideæ*, *-aceæ*, *-ineæ*, *-ales*, &c.), unless, in the new position, one of the obstacles indicated in the Articles of Section 7, supervenes, or the new designation becomes a source of error, or there is some other serious reason against it.

2. When a section or a subgenus becomes a genus, or the inverse changes take place, retain the old names, unless this results in two genera of plants having the same name, or the existence of two subdivisions of the same name in the same genus, or one of the obstacles indicated in the Articles of Section 7 supervenes.

3. When a subdivision of species becomes a species or the inverse change occurs, retain the original epithets, unless this results in two species bearing the same name in the same genus, or two subdivisions bearing the same name in the same species, or unless any of the obstacles indicated in Section 7 supervenes.

Section 7. ON NAMES THAT ARE TO BE REJECTED, CHANGED, OR MODIFIED.

Article 50. No one is authorized to reject, change, or modify a name (or combination of names) because it is badly chosen, or disagreeable, or another is preferable or better known, or because of the existence of an earlier homonym which is universally regarded as non-valid, or for any other motive either contestable or of little import. (See also Article 57.)

Examples.—This rule was broken by the change of *Staphylea* to *Staphylis*, *Tamus* to *Thamnos*, *Mentha* to *Minthe*, *Tillæa* to *Tillia*, *Vincetoxicum* to *Alexitoxicon*; and by the change of *Orobanche Rapum* to *O. sarothamnophyta*, *O. Columbariæ* to *O. columbarihærens*, *O. Artemisiæ* to *O. artemisiiepiphyta*. All these modifications (which are contrary to Article 50) must be rejected.—The name *Diplomorpha* Meissn. in *Regensb. Denkschr.* iii. 289 (1841) must not be substituted for the generic name *Wickstræmia* Endl. *Prodr. fl. Norfolk.*, p. 47 (1833), because of the earlier homonyms *Wi(c)kstræmia* Schrad. *Goett. gel. Anz.*, p. 710 (1821) and *Wi(c)kstræmia* Spreng. in *Vet. Akad. Handl. Stockh.* 1821, p. 167, t. 3, for the former is merely a synonym of the genus *Laplacea* Kunth (1821), and the latter of a subdivision of the genus *Eupatorium* L. (1753).

RECOMMENDATIONS. See on the subject of homonyms Recommendations V. *b* and XIV. *f*, which suggest that cases of this kind should be avoided for the future.

Article 51. Every one should refuse to admit a name in the following cases:—

1. When the name is applied in the plant kingdom to a group which has an earlier valid name.

2. When it duplicates the name of a class, order, family or genus, or a subdivision or species of the same genus, or a subdivision of the same species.

3. When it is based on a monstrosity.

4. When the group which it designates embraces elements altogether incoherent, or when it becomes a permanent source of confusion or error.

5. When it is contrary to the rules of Section 6.

Examples. 1. *Carelia* Adans. (1763) is a name which was applied by its author to a genus which had already received a valid name (*Ageratum* L. [1753]) (synonym); similarly *Trichilia alata* N. E. Brown (in *Kew Bull.* [1896] p. 160) is a name which cannot be maintained because it is a synonym of *T. pterophylla* C. DC. (in *Bull. Herb. Boiss.* ii. 581 [1894]).—2. *Tapeinanthus*, a name given by Boissier to a genus of Labiatae, was replaced by *Thuspeinanta* by Th. Durand, because of the existence of an earlier and valid genus, *Tapeinanthus* Herb., among the Amaryllidaceae (homonym). Similarly *Astragalus rhizanthus* Boiss. (*Diagn. Pl. Or.* ser. 1, ii. 83 [1843]) was renamed *A. cariensis* Boiss. because of the existence of an earlier valid homonym, *Astragalus rhizanthus* Royle *Illustr. Bot. Himal.* p. 200 (1835).—4. The genus *Uropedium* Lindl. was based on a monstrosity which is now referred to *Phragmopedilum caudatum*

Rolfe.—5. The genus *Schrebera* L. derives its characters from the two genera *Cuscuta* and *Myrica* (parasite and host) and must be dropped; and the same applies to *Lemnairea* De Vr. which is made up of elements taken from different families. Linnæus described under the name of *Rosa villosa* a plant which has been referred to several different species, and of which certain identification seems impossible; to avoid the confusion which results from the use of the name *Rosa villosa*, it is preferable in this case, as in other analogous cases, to abandon the name altogether.

Article 52. The name of an order, suborder, family or subfamily, tribe or subtribe, must be changed when it is taken from a genus which, by general consent, does not belong to the group in question.

Example. If it were to be shown that the genus *Portulaca* does not belong to the family *Portulacaceæ*, the name *Portulacaceæ* would have to be changed.—Nees (in Hooker and Arnott, *Bot. Beechey's Voy.* p. 237 [1836]) gave the name *Tristegineæ* to a tribe of Gramineæ, after the genus *Tristegis* Nees (a synonym of the genus *Melinis* Beauv.). But *Melinis* (*Tristegis*) having been excluded from this tribe by Stapf (in *Fl. Cap.* vii. 313) and by Hackel (in *Oesterr. bot. Zeitschr.* li. 464), these authors have adopted the name *Arundinelleæ* from the genus *Arundinella*.

Article 53. When a subgenus, a section or a subsection, passes as such into another genus, the name must be changed if there is already, in that genus, a valid group of the same rank, under the same name.

When a species is moved from one genus into another, its specific epithet must be changed if it is already borne by a valid species of that genus. Similarly when a subspecies, a variety, or some other subdivision of a species, is placed under another species, its name must be changed if borne already by a valid form of like rank in that species.

Examples. *Spartium biflorum* Desf. (1798–1800) when transferred by Spach in 1849 into the genus *Cytisus* could not be called *Cytisus biflorus*, but was renamed *Cytisus Fontanesii*, because of the previous existence of a valid species *Cytisus biflorus* L'Hérit. (1789). The earliest synonym of *Calochortus Nuttallii* Torr. et Gray (in *Pacific Rail. Rep.* ii. 124 [1855–1856]) is *Fritillaria alba* Nutt. (*Gen. Amer.* i. 222 [1818]); but we cannot restore the original epithet of this species, although this has been done in the *Notizbl. des K. bot. Gartens und Mus. Berl.* ii. 318 (1899), because there exists already a valid species in the genus with the name *Calochortus albus* Dougl. in Maund, *Botanist*, t. 98 (1839).

Article 54. Names of genera must be rejected in the following special cases:—

1. When they are formed from a technical term borrowed from morphology, unless they are accompanied by specific names.
2. When they express uninominal nomenclature.
3. When they are formed of two words, unless these two words were from the first united or joined by a hyphen.

Examples.—1. Generic names such as *Lignum*, *Radix*, *Spina*, &c., would not now be admissible; on the other hand, a generic name like *Tuber* should not be rejected when it has been published with specific names (*Tuber cibarium* etc.).—2. Ehrhart (*Phytophylacium* [1780] and *Beiträg.* iv. 145–150) made use of a uninominal nomenclature for species known at that time under binary names (*Phacocephalum*, *Leptostachys*, &c.). These names, which resemble generic names, must not be confused with such, and are to be rejected, unless a subsequent author has given them the value of a generic name; for example, *Bæothryon*, a uninominal expression of Ehrhart's, has been applied to a genus characterized by A. Dietrich, *Spec. Pl.* ii. 89 (1833).—3. Names like *Quisqualis* (a single word from the first), *Sebastiano-Schaueria* and *Neves-Armondia* will stand.

Article 55. Specific names must also be rejected in the following special cases:—

1. When they are ordinals serving for purpose of enumeration.
2. When they merely repeat the generic name.

Examples. 1. *Boletus vicesimus sextus*, *Agaricus octogesimus nonus*.—2. *Linaria Linaria*, *Raphanistrum Raphanistrum*, &c.

Article 56. In the cases foreseen in Articles 51 to 56, the name to be rejected or changed is replaced by the oldest valid name in the group in question, and in default of such a one a new name must be made.

Examples. See the examples cited under Articles 51 and 53.

Article 57. The original spelling of a name must be retained, except in case of a typographic or orthographic error. When the difference between two names, especially two generic names, lies in the termination, these names are to be regarded as distinct even though differing by one letter only.

Examples: *Rubia* and *Rubus*, *Monochæte* and *Monochætum*, *Peponia* and *Peponium*, *Iria* and *Iris*.

RECOMMENDATIONS.

XXX. The liberty of making orthographic corrections must be used with reserve, especially if the change affects the first syllable, and above all the first letter, of a name.

XXXI. Many names differ by a single letter without risk of confusion (ex. *Durvillea* and *Urrillea*). In cases where a close approach to identity is a source of error (ex. *Astrostemma* and *Asterostemma* in one and the same family, *Asclepiadaceæ*, *Pleuripetalum* in *Orchidaceæ*), only one, the older, of the names should be kept, in accordance with Article 51, 4.

IV. Modification of the Rules of Botanical Nomenclature.

Article 58. The Rules of Botanical Nomenclature can only be modified by competent persons at an International Congress convened for the express purpose.

APPENDIX. VARIOUS RECOMMENDATIONS.

XXXII. Botanists should use in modern languages Latin scientific names or those immediately derived from them, preferably to names of another kind or origin. They should avoid the use of the latter unless these are very clear and in common use.

XXXIII. Every friend of science should oppose the introduction into a modern language of names of plants which are not already there, unless they are derived from Latin botanical names by means of some slight alteration.

XXXIV. The metric system only is used in botany for reckoning weights and measures. The foot, inch, line, pound, ounce, &c., should be rigorously excluded from scientific language.

Altitude, depth, rapidity, &c., are measured in metres. Fathoms, knots, miles, &c., are expressions which should disappear from scientific language.

XXXV. Very minute dimensions are reckoned in μ (micromillimetres, microns, or thousandths of a millimetre), and not in fractions of a millimetre or line, &c.; fractions encumbered with ciphers and commas are more likely to give rise to mistakes.

XXXVI. Authors are asked to indicate clearly and precisely the scale of the figures which they publish.

XXXVII. Temperatures are expressed in degrees of the Centigrade thermometer of Celsius.

[Appended to the Rules as officially issued (in French, German, and English) is an "Index nominum genericorum utique conservandarum" in accordance with Article 20. From this we have selected the following, which appear in British books, as being of special interest to our readers. The full list will of course be found in the official issue of the Rules.]

CALYSTEGIA R. Br., Prodr. (1810) 483.

(*Volulus* Medik. in Staatswiss. Vorles. Churpf. Phys. Œkon. Ges. i. (1791) 202.)

CAPSELLA Medik., Pflanzengatt. (1792) 85.

(*Bursa* [Siegesb.] Weber in Wiggers, Prim. Fl. Holsat. (1780) 47: *Marsypocarpus* Neck., Elem. iii. (1790) 91.)

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(*Carbenia* Adans., Fam. ii (1763) 116.)

CORYDALIS Medik., Phil. Bot. i. (1789) 96: Vent. Choix (1803) 19.

(*Capnoides* Adans., Fam. ii. (1763) 431: *Cisticapnos* Adans., ibid. 431: *Neckeria* Scop., Introd. (1777) 313: *Pseudofumaria* Medik., Phil. Bot. i. (1789) 110.)

* "Cnicus L. Spec. Pl. ed. i. (1753) 826 amplectitur et *Cnicum* Gærtneri et *Cirsium* Adans. em. DC. Genere Gærtneriano recepto genus homonymum Linnæanum interdum pro nomine usitato '*Cirsium*' adhibitum [cf. Benth. in Bentham et Hooker f., Gen. ii. (1873) 468] rejiciendum est; itaque valet *Cirsium* Adans. [DC. Prodr. vi. (1837) 634]."

- CYNODON L. C. Rich. in Persoon, Synops. i. (1805) 85.
 (*Capriola* Adans., Fam. ii. (1763) 31: *Dactilon* Vill., Hist. Pl. Dauphiné ii. (1789) 69: *Fibichia* Koel., Descr. Gram. (1802) 308.)
- DABÆCIA D. Don in Edinburgh New Phil. Journ. xvii. (1834) 160.
 (*Boretta* Neck., Elem. ii. (1790) 212.)
- ERANTHIS Salisb. in Trans. Linn. Soc. viii. (1807) 303.
 (*Cammarum* Hill. British Herbal (1756) 47 t. 7: *Helleboroides* Adans., Fam. ii. (1763) 458.)
- EROPHILA DC. Syst. ii. (1821) 356.
 (*Gansblum* Adans., Fam. ii. (1763) 420.)
- FALCARIA Host. Fl. austr. i. (1827) 381.
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- LEERSIA Swartz, Prodr. Veg. Ind. occ. (1788) 21.
 (*Homalocenchrus* Mieg in Acta Helvet. Phys. Math. &c. iv. (1760) 307.)
- LISTERA R. Br. in Aiton, Hort. Kew. ed. 2. v. (1813) 201.
 (*Diphryllum* Raf. in Med. Repos. New York v. (1808) 356.)
- LOISELEURIA Desv. Journ. de Bot. iii. (1840) 35.
 (*Chamæcistus* Eder Fl. Dan. (1761) t. 9.)
- LUZULA DC. in Lamarck et De Candolle, Fl. Franç. ed. 3. iii. (1805) 158.
 (*Juncoides* [Mœhr. ex] Adans., Fam. ii. (1763) 47.)
- MAIANTHEMUM Web. in Wiggers, Prim. Fl. Holsat. (1780) 14.
 (*Unifolium* [Mœhr., Hort. priv. (1736) 101] Adans., Fam. ii. (1763) 54: *Valentinia* Heist. ex Fabricius, Enum. Pl. Hort. Helmstad. ed. 2. (1763) 37.)
- MALCOLMIA R. Br. in Aiton, Hort. Kew. ed. 2. iv. (1812) 121.
 (*Wilckia* Scop., Introd. (1777) 317.)
- MERTENSIA Roth. Catal. Bot. i. (1797) 34.
 (*Pneumaria* Hill. Veg. Syst. vii. (1764) 40.)
- NARTHECIUM Juss., Gen. (1789) 47.
 (*Abama* Adans., Fam. ii (1763) 47.)
- NEOTTIA Swartz in Vet. Akad. Nya Handl. xxi. (1800) 224.
 (*Nidus* Riv., Icon. Pl. fl. irreg. hexapet. (1760) t. 7.)
- OXYTROPIS DC., Astragal. (1802) 24 et 66.
 (*Spiesia* Neck., Elem. iii. (1790) 13.)

- PLATANThERA L. C. Rich. in Mém. Mus. Paris iv. (1818) 48.
(*Lysias* Salisb. in Trans. Hortic. Soc. i. (1812) 288.)
- RHYNCHOSPORA Vahl, Enum. ii. (1806) 229.
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- SIMETHIS Kunth, Enum. pl. iv. (1843) 618.
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- SPERGULARIA J. et C. Presl, Fl. Cech. (1819) 94.
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- SPIRANTHES L. C. Rich. in Mém. Mus. Paris iv. (1818) 50.
(*Gyrostachis* Pers., Synops. ii. (1807) 511 : *Ibidium* Salisb. in Trans. Hort. Soc. i. (1812) 291.)
- SUÆDA Forsk., Fl. Ægypt. Arab. (1775) 69 t. 18.
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